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MODERN AGRICULTURE;

OR, THE

PRESENT STATE OF HUSBANDRY

IN

GREAT BRITAIN.

INCLUDING,

AN ACCOUNT OF

THE BEST MODES OF CULTIVATION PRACTISED THROUGHOUT THE ISLAND;

THE OBSTACLES TO FARTHER IMPROVEMENTS;

AND THE MEANS BY WHICH THESE MAY BE MOST EFFECTUALLY REMOVED.

BY JAMES DONALDSON, DUNDEE.

IN FOUR VOLUMES.

VOL. II.

Be gracious Heaven! for now laborious man
Has done his part. Ye foſtering breezes blow!
Ye foſtering dews, ye tender ſhowers, deſcend!
And temper all, thou world reviving ſun,
Into the perfect year. THOMSON.

EDINBURGH:

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MODERN

MODERN AGRICULTURE;

OR, THE

PRESENT STATE OF HUSBANDRY

IN

GREAT BRITAIN.

CHAPTER VI.

Terms of Entry to Farms, and the different Modes in which Rents are paid.

THESE fall naturally under review immediately after the preceding chapter, wherein the tenors of ſuch leaſes as appear beſt calculated to inſure the permanent improvement of both kingdoms have been fully detailed.

Fixing proper terms of entry to farms is a matter that requires no ſmall degree of conſideration. Was a fair eſtimate made of the ſums which entering tenants, on the one hand, are frequently obliged unneceſſarily to expend, when

ſubjected to partial entries to farms; or, on the other, the loſſes which outgoing tenants often ſuſtain, by being obliged to relinquiſh poſſeſſion of the houſes, while their crops remain in the fields; landlords would at once be ſatisfied of the neceſſity of an alteration in the common terms of removal and entry.

The different modes in which rents are paid, will be afterwards explained; but it may be proper to obſerve, that the terms of payment ought entirely to depend on the mode of occupation. The rent of a grazing farm ſhould be paid at Michaelmas or Martinmas after the graſs-ſeaſon. That of a corn-farm, in no caſe, before Whitſuntide, after reaping the crop. When the farm is occupied in mixed huſbandry, Martinmas and Whitſuntide are the moſt equitable terms of payment. By adopting theſe arrangements, farmers would have it in their power to provide for the payment of their rents, without diſpoſing of the produce at an under price for ready money; a practice no leſs ruinous than common.

In treating of theſe ſubjects, it may be right to arrange them into diviſions, or ſections, *viz.*

Section I. Terms of entry to farms,—what are the moſt convenient for all parties.

II. The different modes in which rents are paid.

SEC-

SECTION I.

Terms of entering to Leaſes,—what are the moſt convenient for all parties.

THE ordinary term of entry to a farm in England is Lady-day; but Candlemas, Whitſuntide and Michaelmas, are alſo common terms in ſome parts of the kingdom. In either of theſe caſes, except the laſt, the removing tenant has a right to cultivate a certain proportion of the tillage lands, which is called the away going crop; the extent of which depends on the covenants of the leaſe, or the underſtood agreement between the landlord and him.

In Scotland, the entry to the houſes, garden, and meadow-graſs, takes place, in general, at Whitſuntide, and to the arable lands, and artificial graſſes, at the ſeparation of that year's crop from the ground; or, in other words, at the cloſe of harveſt. In ſome caſes, the incoming tenant enters to the poſſeſſion of the whole premiſes at Martinmas.

In regard to the proprietor perſonally, he is really very little intereſted in the terms of entry, except in thoſe caſes where he becomes bound to the incoming tenant to build houſes in a limited time.

A general clauſe, however, in leaſes, importing, "That the proprietor ſhall have liberty at "any period, during the laſt two years of the "leaſe, to work quarries, uſe roads, and erect "farm-buildings, for the accommodation of the "then ſucceeding tenant, on paying the ſur-"face-damage, as the ſame ſhall be aſcertained "by two men to be mutually choſen," would completely obviate any difficulties that the landlord can be perſonally ſubjected to by changing tenants. Two circumſtances ought always to be particularly attended to by proprietors in framing leaſes, namely, that the terms of entry ſhould be ſo regulated as to ſuit the intereſt and convenience of the entering tenant, without infringing too much on the neceſſary accommodation to be granted to the perſon who removes; alſo, that the outgoing and incoming tenants ſhould be made to have as little dependence or interference with each other, as two perſons ſo ſituated can poſſibly have. In regard to the firſt, it is certainly fair, (and is much preſſed upon landlords and their ſtewards in every treaty for a leaſe), that the proprietor ſhould be more watchful of the intereſt and convenience of that perſon with whom he is making a bargain which is to exiſt for a number of years, than of that perſon with whom his tranſactions are about to be cloſed. With reſpect to the ſecond, every perſon acquainted with

with the management of eſtates, muſt know, that outgoing and incoming tenants ſeldom agree. Their intereſts are indeed ſo oppoſite, that it is ſcarcely ſuppoſable they ſhould. Frequently, for no other reaſon than that the proprietor has made choice of the one in preference to the other, a jealouſy is entertained, and hoſtilities are commenced, which, aided by that numerous and active body of people called *tale-bearers*, very frequently terminate in open warfare.

Keeping theſe circumſtances in mind, and viewing the farms in Great Britain as either chiefly employed in paſture or grazing, the cultivation of grain, or in alternate courſes of graſs and corn huſbandry, the next thing to be conſidered is, what terms of entry to each are beſt adapted to the convenience and accommodation of both parties.

Paſture or Grazing Farms.—It will be univerſally acknowledged, that it is of great importance to an entering tenant, to get poſſeſſion of the entire premiſſes *at one time*, ſo that he may have it in his power at once to enter on the active management of the whole farm, and ſo far as it can be arranged, the entry ſhould take place at the ſeaſon of the year, when the incoming tenant can purchaſe the neceſſary live-ſtock on the moſt reaſonable terms, which he is always certain

tain of having in his power immediately before the commencement of the graſs-ſeaſon. Lady-day or Whitſuntide are therefore the beſt terms for entering to farms of this deſcription, as beſides the reaſon juſt mentioned, it happens, that between theſe terms of entry, and the period when the farm is moſt valuable, namely, the graſs-ſeaſon, there is no lapſe of time beyond what is neceſſary for purchaſing the ſtock.

The removing tenant can ſuffer no inconvenience from quitting the whole premiſſes at once, eſpecially at that ſeaſon of the year, when, if the farm had been devoted to the grazing and fattening ſyſtem, the laſt of his former year's ſtock muſt be in proper condition for the butcher. If his object was breeding and rearing, or dairy-branches of huſbandry, the beginning of ſummer is the beſt ſeaſon for diſpoſing of ſuch ſtock, ſhould he ſo incline; nor can it ſuffer any detriment in being then removed to another farm.

Farms employed chiefly in the Cultivation of Grain.—On all corn-farms, where regular rotations of cropping are adopted, a certain proportion of the land is every year under turnips or fallow. This is neceſſary as a preparation for wheat or barley. Tenants of ſuch farms are generally bound, not only to adhere to the ſame rule during the laſt year of the leaſe, but alſo to allow

allow their ſucceſſors to ſow graſs-ſeeds, and to reap the benefit both of the turnip-crop and fallow, on being paid ſuch a ſum as perſons mutually choſen may determine to be an adequate compenſation. Were ſuch clauſes included in all leaſes of corn-farms, (and ſurely there is nothing to prevent it), an entering tenant might get entire poſſeſſion of the farm at the terms of Michaelmas or Martinmas. Theſe are certainly the moſt convenient periods at which he could poſſibly aſſume poſſeſſion. In place of being at the expence of maintaining his family for ſix months, before he is able to do any thing material towards the cultivation or improvement of the farm, he would only enter when his preſence and his ſtocking were neceſſary for preparing the lands for the enſuing crop, and when he could, with the greateſt convenience, and on the moſt moderate terms, purchaſe horſes, corn, hay, ſtraw, and every other article, which he might deem neceſſary, and which are cheaper at that ſeaſon than at any other during the whole year.

This mode, and theſe periods of removal, muſt alſo be much in favour of the outgoing tenant. In place of quitting the houſes while his corns were growing in the fields, and being obliged to return for the purpoſe of reaping and ingathering them, he would, by this arrangement, be allowed to remain till his crop was fairly brought to maturity,

maturity, and ſecured from the poſſibility of receiving any damage.

Convertible Lands, or alternate Corn and Graſs Farms.—There appears no ſufficient reaſon why the ſame terms of removal and entry, as laſt mentioned, ſhould not be beſt ſuited to farms of this deſcription. Similar reaſons occur to ſupport that opinion, whether the intereſt and convenience of the incoming or outgoing tenants are conſidered. The former is ſaved the trouble of an eſtabliſhment for ſix months, from which, although expenſive, he could derive little advantage, while the latter has the ſatisfaction of reſiding on the farm, ſo long as his intereſt in that year's crop can be thereby promoted; and both have the conſolation of reflecting, that if the interferences between them are not of the moſt pleaſant nature, they will at leaſt be ſoon terminated.

SEC.

SECTION II.

The different Modes in which Rents are paid.

THE rents payable in Great Britain, particularly in Scotland, were formerly various and multiform. Over the greateſt part of the iſland, they are now paid in money, and at two terms in the year. In England, Michaelmas and Lady-day are the cuſtomary terms of payment; the firſt payment commences ſix months after entry to the poſſeſſion of the farm. The ordinary terms in Scotland, are Martinmas and Whitſuntide, or Whitſuntide and Martinmas, the tenant being allowed twelve months credit of the firſt half of the rent, in the one caſe, and in the other, eighteen *.

It was the cuſtom in former times, in various parts of Great Britain, for the tenants to pay what was called *forehand rents*, that is, paying the half, and in ſome caſes, the whole year's rent immediately on entering to the farm, and before any benefit was derived from the poſſeſſion of it. This practice is, however, now generally diſuſed, although ſtill kept up in ſome parts of Stafford and Perth ſhires.

* This difference in the terms of the payment of rents is material in the purchaſe of landed property; in general, near one year's purchaſe in favour of England.

Letting lands for a term of years at the former rent, but making the farmer pay a conſiderable ſum in ready money by way of fine, was alſo a very common cuſtom; but is now chiefly confined to the Crown and Church lands in England. This mode was evidently attended with bad conſequences. By draining the tenant of all, or greateſt part of his ready money, he was prevented from improving his farm. Leaſes of lands are conſidered in law as heritable property; therefore, in the event of the demiſe of the tenant, ſoon after having completed a tranſaction of this nature, his eldeſt ſon ſucceeded to the leaſe, and the widow and other children were of courſe, in many inſtances, reduced to poverty: All that was left to them being their proportion of the ſtock on this farm, and often thereby the heir was rendered incapable of keeping poſſeſſion of the farm. In a word, in nine caſes out of ten, it was robbing the tenant of the well-earned reward of his induſtry, during the exiſtence of the former leaſe, and depriving him of the means of turning out his new acquiſition to the beſt account, without giving any ſolid advantage in return.

Along the greateſt part of the eaſt coaſt of Scotland, which is the principal corn country in the kingdom, a conſiderable proportion of the rent of almoſt every farm is paid in grain, and oat-meal. Theſe articles being

leſs

leſs fluctuating in their value than money, this appears the moſt equitable mode in which the rents of corn farms can be paid. It may indeed affect the farmer's intereſt when any ſudden and unexpected riſe takes place in the price of grain; but if a judgment can be given from experience, it will be found this very ſeldom happens. On the contrary, for theſe laſt twenty years, with only two exceptions, 1783 and 1795, the price of grain, owing to the operation of the corn-laws, has been extremely moderate, while every other production of a farm has been doubled in value, and in many caſes tripled. The public are often eſſentially benefited by ſo great a proportion of the rents being paid in this way. Many of the proprietors have granaries erected on their eſtates, where, in times of plenty, they ſtore the grain and meal which they receive from their tenants. And every perſon, who is in any degree acquainted with the agricultural exports and imports which take place between ſome diſtricts in Scotland and others, muſt know, that the ſupplies afforded, on many occaſions from theſe ſtore-houſes, have been the means of preventing ſcarcity, and an unreaſonable advance in the price of theſe articles in the large manufacturing towns.

In the moſt northern parts of Scotland, the rents are, to a certain extent, paid in perſonal ſervices. The tenants are bound to plough and harrow a certain

certain portion of the landlord's farm, to reap, carry home, thraſh, dreſs, and mill a certain quantity of the crop. They are alſo bound to pay poultry, eggs, butter, cheeſe, ſheep, ſwine, linen yarn, fiſh, &c.; in a word, they are more the ſlaves of the landlords than their own maſters. However, as the ſun of agricultural improvements ſhines at preſent ſo bright in the ſouthern part of the Britiſh hemiſphere, it is to be hoped, his rays will ſoon penetrate this remote corner of the iſland; and that the proprietors will be induced to conſider it for their intereſt, as it is no doubt their duty, to emancipate ſo great a number of the human race from miſery, ignorance, and bondage.

Parliamentary and parochial taxes may be ſaid to be paid by the tenants over the greateſt part of both kingdoms; and many leaſes contain a clauſe binding the tenants to pay, not only all the taxes that are impoſed, but alſo all that may be impoſed.

It appears abſurd, that the proprietors, whoſe intereſt it is to attend to the increaſe or decreaſe of all ſuch taxes as more immediately concern their property, ſhould devolve the payment of thoſe taxes on their tenants. They muſt know, that whoever pays them in the firſt inſtance, to them the lands are of leſs value, in conſequence of ſuch taxes having been impoſed. They ought alſo to conſider, that their influence might

be the means of keeping the moſt extravagant of them* within more reaſonable bounds, than it is to be expected the utmoſt exertions of the tenants can be able to effect. Further, proprietors could aſcertain the value of their property with more minute exactneſs, were they, on the one hand, to receive from their tenants the full rents which their lands are worth, and, on the other, pay all taxes to which they are ſubjected. The intereſt of agriculture, and the eaſe and comfort of the farmers, would at the ſame time be eſſentially promoted, were they relieved from theſe teazing exactions and compoſitions with which they are ſo frequently moleſted, particularly in England.

When it is conſidered how many circumſtances operate in determining the rent of land, and how much theſe frequently vary in the ſame pariſh or lordſhip, it will be found impoſſible to form any correct idea in regard to the rents payable by the acre for the various kinds of ſoils over Great Britain at large. Any conjecture that may be formed, (for the ſubject admits no more), muſt be vague, and therefore unintereſting.

The remarkable change that has of late taken place in the ſituation of theſe kingdoms, and the manners of the people, by the abolition of the feudal ſyſtem, the increaſe of commerce, manufactures, and agricultural improvements, with the

* The tithes and poor rates in England.

the immenſe additional quantity of paper money introduced, within theſe few years into circulation, has the effect of enhancing both the value and rent of lands. While theſe flouriſh, and paper money ſupports its nominal value, lands in property or leaſe muſt neceſſarily continue to advance. Should any croſs accident interrupt the former, or depreſs the value affixed to the latter, the recent great advance in the rent of lands, in various parts of both kingdoms, would render ſuch calamities more univerſal in their effects.

CHAP-

CHAPTER VII.

Farm Houſes and Repairs.

THE farmers over the greateſt part of England and Wales ſtill live crowded together in villages, as if the ſame reaſons for ſo doing, which exiſted ſeven or eight hundred years ago ſtill remained. In almoſt all theſe caſes, and more eſpecially in the open field pariſhes, the farmers are, upon the whole, but indifferently accommodated; and the farm-buildings by no means ſuch as to convey to the mind of the paſſing ſtranger the idea, that ſpirited agriculture much prevailed.

In form or plan, they are, for the moſt part, totally deſtitute of regularity; here a ſtable, there a ſhade, and in a third place, a cow-houſe, —all ſo unconnected with the barn, or with each other, that they appear rather as ſeparate buildings placed by chance than as ſo many parts of one whole.

The

The dwelling-houſe, which is generally built of ſtone or brick, (although frequently of wood and plaſter), is compoſed of two ſtories, having commonly a back kitchen or ſcullery, and milk-houſe, and keeping-place, to the north; the roof coming down on that ſide, till within ſix or ſeven feet of the ground, where it is ſupported by the wall, which forms the north ſide of theſe places laſt mentioned. The uſual covering is of tiles or ſtraw, but frequently ſlates, when they can be eaſily procured, and at a moderate expence. Within, it may be truly ſaid, cleanlineſs and order vie with hoſpitality for the pre-eminence. The apartments are plain, but neat, and ſufficient to accommodate a numerous family. The ground-floor is, with very few exceptions, formed of paving bricks, and above ſtairs, of wood, but in ſome counties, frequently of plaſter; which laſt, when properly cemented, makes a very good floor, even in a bed-chamber.

The barns on theſe farms, as well as on thoſe which will be afterwards taken notice of, are extremely large in proportion to the extent of the farms. They are commonly built of the ſame materials with the dwelling-houſes, and, for the moſt part covered with tiles or ſtraw; when, with the laſt, it is neatly ſewed on, and to the thickneſs of ten or twelve inches. The doors, of which there is one towards the middle

of each ſide-wall, are of a ſize to permit a loaded waggon to paſs through. The floors are very neatly and ſubſtantially formed of plaſter, and the thraſhing place laid with oak, or other plank.

With reſpect to the ſtables, cow-houſes, ſhades, and other buildings, on farms of this deſcription, there is nothing particularly worthy of remark, either as to the materials of which they are compoſed, or the manner in which they are put together.

In thoſe parts of England where incloſures have been moſt general, and more particularly where farm-buildings have been erected towards the centre of the farm, they are ſubſtantial, extenſive, and well executed, and do no leſs credit to the taſte than to the liberality of the proprietors, affording the tenant not only a comfortable reſidence for himſelf and family, but alſo every requiſite accommodation for carrying on the operations of the farm to the greateſt poſſible advantage.

The general practice in England is for the proprietors to be at the expence of erecting new buildings, and of all extraordinary repairs *. They alſo furniſh all materials for ordinary repairs, except ſtraw for thatch. The tenants in this laſt caſe are bound to be at the expence of all carriages, and to pay all workmens accounts.

* Namely, a general repair at the entry of a new tenant, or ſuch as are rendered neceſſary in conſequence of accidents by fire.

Conſidering the narrow confined ſpace which many of the farmers occupy in the villages, they cannot in many caſes extend their farm-offices in any regular order; and the want of leaſes, and uncertainty of continuance, are the principal reaſons why additions or repairs are ſo often neglected, or, if attended to, ſo ſuperficially executed.

Till within theſe thirty years, the practice of building decent comfortable farm-houſes, was in a great meaſure confined to the ſouth-eaſt part of Scotland, and even there it was by no means general. It was the univerſal cuſtom for the proprietors to furniſh what was called the *great timber* neceſſary for erecting buildings or executing repairs, and for the tenants to defray all other expences.

If the houſes were meliorated or improved during the tenant's occupation, he was paid at his removal by his ſucceſſor. If, on the contrary, they had ſuffered any deterioration, he was bound to make it good to the entering tenant. The dwelling-houſes, as well as the offices, were poor, mean, low buildings; in ſome caſes, compoſed of ſtone and clay, with a thin covering of ſtraw, ſuperficially put on, but more generally entirely of clay or turf, or of ſtone, without any particle of cement, and covered like the dwelling-houſe, or only with a ſlender paring of turf, provincially called *divots*.

The

The proprietors having within theſe laſt thirty years turned their attention to the improvement of the country, they ſoon ſaw, that one material ſtep thereto, was, accommodating their tenants with better houſes; and as the farms were then by much too ſmall to induce men of knowledge and enterpriſe to turn their attention to huſbandry, it was found neceſſary to enlarge them. New houſes became of courſe requiſite, and ſuch proprietors as poſſeſſed public ſpirit ſufficient to induce them to take the lead, erected farm-buildings in a much ſuperior ſtyle.

Theſe meaſures, as might naturally be expected, were attended with the beſt conſequences. Agriculture, which was then in a very languiſhing ſtate, began to revive, and the profeſſion of that art was no longer conſidered as mean or diſgraceful; the farmer was taught to know the comforts of life, and his exertions and induſtry were thereby called forth to acquire them.

The improvements that have taken place in the conſtruction of farm-houſes ſince the period above mentioned, are truly aſtoniſhing, and were probably never exceeded in ſo ſhort a time in any kingdom in Europe.

In almoſt every part of Scotland ſouth of the Grampian mountains, the farm-houſes are regularly and ſubſtantially conſtructed, and of ſize ſufficient

ſufficient for the extent of the farms. They are built of ſtone and lime, covered with ſlates, tiles, or ſtraw neatly ſewed on, as is the practice in England. Many of the dwelling-houſes, in ſize, accommodation, and mode of furniſhing, are equal to any in that kingdom; nor will it be found that cleanlineſs and hoſpitality are ſtrangers within.

Where new houſes are neceſſary, the proprietors are, in general, at the expence of all materials and workmanſhip, and the farmer performs the carriages. Where the houſes are ſufficient in point of extent, but ſtand in need of a thorough repair, this is performed at the proprietor's expence, in the firſt inſtance, or the tenant undertakes to execute the work, and is allowed, at the expiry of the leaſe, the additional value of the houſes beyond what they were aſcertained to be worth at the commencement.

Except in ſome parts of the ſouth-eaſt coaſt of that part of Scotland, lying north of the Grampian mountains, the farm-houſes have undergone very little alteration, conſequently the ſituation of the great body of the tenants is not much improved in this reſpect. Nine-tenths of them, nay, more probably nineteen-twentieths, being ſtill inhabiting dark, diſmal, dirty hovels, where ſmoke and naſtineſs hold a diſputed reign *.

In

* In ſome caſes the horſes or cows occupy one end of the houſe, while the farmer and his family inhabit

In that quarter of the kingdom, the ancient practice of the proprietors furniſhing wood only, as their ſhare of the expence of erecting farm-buildings, prevails. When farms are enlarged, and new and better houſes of courſe become neceſſary, the proprietors, in place of advancing money, for the purpoſe of erecting them, oblige their tenants to be at the whole expence, covenanting, however, that they ſhall be repaid to a certain extent (commonly about one year's rent) at the expiry of the leaſe.

In regard to the ſhare of expence and trouble which proprietors and tenants in general ought to be ſubjected to in erecting farm-houſes; all leaſes ſhould contain a clauſe, by which the proprietors become bound to be at the expence of materials and workmanſhip, to the extent of a ſtipulated ſum, rather above than below two years rent. The tenants ſhould not only undertake the carriage of materials, without making any charge for ſo doing, but alſo become bound to keep the houſes in good order, and to relinquiſh them equal in value at the expiry of the leaſe *, or

the other, and the door is common to both. So negligent are ſome proprietors to the welfare of thoſe whom Providence has placed under their more immediate protection.

* It has been a common practice in ſome parts of Scotland, (which ought to be introduced every where), to

or to pay any deficiency, as the ſame may be determined by proper tradeſmen, mutually choſen.

The farmer's capital, it will readily be acknowledged, ought to be employed in ſtocking and improving the farm, rather than in erecting houſes; therefore, it is certainly bad policy in the landlord to divert that capital from thoſe channels in which it ought to flow freely, and without interruption. On the other hand, the circumſtance of the tenant being obliged to maintain the houſes in good condition during his leaſe, and to leave them of equal value at his removal, would induce him to pay proper attention that the houſes be ſubſtantially built, and that every neceſſary repair be completed in proper time, and in the moſt effectual manner.

When *repairs* only are neceſſary on the entry, they ought to be performed at the mutual expence of parties. The proprietor ſhould advance the requiſite ſum for materials and workmanſhip, and the tenant perform all the carriages. A clauſe ſhould alſo be introduced into the leaſe, by which the landlord may have a right to execute repairs, provided

to bind tenants to inſure their houſes from any damage by fire. This clauſe in leaſes is attended with another good conſequence: The tenants generally inſuring their ſtock and houſe-furniture at the ſame time, ſo that when any accident happens, they are ſaved from the ruin which otherwiſe muſt neceſſarily enſue.

provided they are deemed requiſite by proper tradeſmen ſent to inſpect the houſes, intimation thereof being made a reaſonable time before to the other party. This would prevent that heavy load of expence which proprietors are frequently ſubjected to when tenants remove, and a mutual intereſt in the preſervation of the buildings would be formed between the proprietor and tenant. The tenant, although liable to pay for frequent partial repairs, would avoid the expenditure of large ſums; and, if bound to leave the houſes equal in value to what they were when he entered, as he certainly ought to be, the landlord would ſeldom be put to the expence of large ſums in the erection of new buildings.

There are ſeveral circumſtances to be attended to, as well in regard to the ſituation as to the form and extent of farm-buildings. The Roman writers on huſbandry conſidered the former of great importance in regard to their villas; and every day's experience proves the wiſdom and propriety of paying due regard thereto, when farm-houſes are the object.

Among the various particulars to be kept in view when making choice of a proper place on which to erect farm-houſes, the following, as they are moſt important, claim the greateſt attention, namely, a central ſituation, a free circulation,

lation of air, and an abundant ſupply of water.

The advantages reſulting from the houſes being placed near the centre of the farm, muſt be obvious to every farmer. Every one muſt be ſatisfied, that a farm, whatever is the extent, when lying compact and around the houſes, can be cultivated in leſs time, and conſequently at a ſmaller expence than if it was of an irregular form, and the houſes in a remote corner. Inſtances might be mentioned of farms, where the ſervants and horſes travel annually, ſome hundred miles in the one caſe beyond what is neceſſary for them to do in the other. The additional expence and loſs of time attending the cultivation of an open field farm in England, where the pariſh is large, and the lands divided into ſmall detached lots, may be ſaid to operate nearly to the ſame extent, againſt a farmer, as if he was to uphold three teams to do the work of a farm, which his neighbour was able to perform to as good purpoſe with two.

In a variable climate like that of Great Britain, and where ſo great a quantity of rain falls, eſpecially towards the end of the year, it is no doubt in favour of the health of the inhabitants at large, that the houſes ſhould be erected in dry and airy ſituations; and it muſt be for the intereſt of the farmers to have their farm-buildings ſo placed, not only for the reaſon

ſon now mentioned, but alſo for the preſervation of their corns in the ſtack-yards. Theſe, when open to the weſt and north winds, which are moſt prevalent in the end of harveſt, are much better adapted to preſerve corn, even when brought home in the moſt precarious ſtate, than thoſe in hollow ſituations, incumbered with trees, and where no free circulation of air can take place. Farm-houſes erected on dry elevated ſpots, are alſo more durable, and leſs liable to require repairs; therefore, whether they are upheld by the proprietor or tenant, to make choice of ſuch ſituations is equally for the intereſt of both.

Beſides the advantages reſulting from a command of water, either for the purpoſe of irrigation, or ſupplying the paſture-fields, farmers derive great benefit from having a ſufficiency at hand, not only for all domeſtic purpoſes, but alſo for the uſe of their cattle. The time which is taken up in driving cattle a conſiderable diſtance to water in dry ſeaſons in ſummer, and the misfortunes which frequently happen from the ſame cauſe in winter, muſt be known to every farmer, and ought to operate very powerfully in inducing them, on all occaſions, to pay proper attention to neceſſary accommodation in this reſpect.

After fixing the proper ſituation for farm-buildings, the next thing to be attended to is,

the model or plan on which they ought to be erected. From the practice of almoſt every diſtrict in the iſland, where farm-houſes on a proper ſcale have been built, as well as for reaſons which will be afterwards mentioned, three ſides of a ſquare, with the dwelling-houſe at a little diſtance to the ſouth, appears upon the whole the moſt commodious that has hitherto been introduced. Where the ſize of the farm, however, is ſo ſmall, as not to require ſuch an extent of houſes as would form a clear area, of from ninety to one hundred feet each way, this plan of building ſhould never be attempted, as the ſpace would be too narrow, and confined, for any uſeful purpoſe.

A foddering yard, on a proper conſtruction, is known to be a neceſſary appendage to all well regulated farms, and is conſidered by intelligent farmers as indiſpenſable. When the farm-buildings are erected in the form of a ſquare, the court-yard ought to be paved to the extent of nine or ten feet from the bottom of the walls all round. The earth ſhould be excavated from the remainder, ſo as to form a hollow towards the centre. Then a thick coat of gravel ſhould be laid over the whole, which would anſwer the double purpoſe, of keeping the place dry, and would facilitate the ſhoveling up the rotten dung. Care ſhould alſo be taken, to have a proper drain to

carry

carry off ſuperfluous water *. When the dung is carried away every ſeaſon, the court-yard ſhould be covered to the depth of two or three feet with chalk, marl, ſcourings of roads or ditches, or any ſort of rotten vegetables, as a foundation for next year's ſtock. If theſe particulars were attended to, and the dung from the ſtables, cow-houſes, and other buildings, where the live ſtock is kept, regularly ſpread over the refuſe of the ſtraw, trod down by the cattle, a treaſure of valuable manure would be amaſſed, which would amply repay the trouble and expence. It would be much for the intereſt of every farmer, that there was a pump well, or other abundant ſupply of water, either within, or immediately adjoining the ſtraw-yard; and wherever this can be had, no expence ſhould be ſpared in order to procure it, as few things injure live ſtock more, than the want of a regular ſupply of this very neceſſary article.

Before deſcribing the manner of arranging farm-buildings, it may proper to ſubjoin a liſt of ſuch as are deemed requiſite.

Liſt

* It would be very advantageous, to have a pond for the reception of this ſuperfluous water, which ſhould be ſo placed, as to flood any of the adjoining fields at pleaſure.

Liſt of houſes requiſite for a farm of conſiderable ſize:

Dwelling-houſe.
Barn.
Harneſs-room and chaff-houſe.
Stables.
Cart-ſhed, carpenter's ſhop, and granary.
Cattle-ſhed.
Houſes for fattening cattle, and holding turnips, *&c.*
Cow-houſe.
Houſe for calves.
Poultry houſes, and hogs ſtye.

It is propoſed to avoid, in general, laying down any particular rules as to the dimenſions of each of theſe houſes; that being a matter which muſt always be regulated by particular circumſtances, and which will be found to vary in almoſt every caſe. The object in view at preſent, is confined to an explanation of the connection which ſhould be attended to, when erecting farm-buildings, ſo as to derive the greateſt advantage therefrom.

Dwelling-houſe.—The dwelling-houſe ſhould be placed at a convenient diſtance from the wall which runs acroſs the front of the court of offices, ſo as to be entirely unconnected with the farm-buildings, and yet commanding a complete

plete view of them from the windows. The farmer, when confined by ſickneſs, or any other cauſe, would thus have an opportunity of ſeeing how his people were employed when he could not give them his perſonal attendance. For a farm of any tolerable extent, the dwelling-houſe ſhould be of two ſtories, with ſuch a number of apartments and conveniencies *, as are fully ſufficient for the accommodation of the farmer and his family. While too large a ſize ought to be avoided on the one hand, it ſhould not on the other be too ſmall; having that degree of neatneſs, which, according to Columella, would allure the wife to take delight in it.

Barn.—Since the invention of that valuable machine, known by the name of a thraſhing-mill, and which will be found particularly deſcribed in the following chapter, one barn is ſufficient for any farm, whatever may be the extent. If the open part of the ſquare is made to front the ſouth, which it ought to do, that it may not only enjoy the influence of the ſun in winter, but alſo be ſcreened from the northern blaſts in that inclement ſeaſon; the barn ſhould be in the north-weſt corner, and occupy ſuch proportions of the north and weſt ſides, as may be judged neceſſary. By this means, there would be free acceſs from the barn to the ſtack-yard, which ought

* Among the laſt, a cool dairy and larder, or keeping place, ought not to be omitted.

ought to be open to the north and weſt; and, as will be afterwards explained, it would be in the moſt central ſituation, in regard to the ſtables and cattle-ſhed, where the greateſt quantity of ſtraw would be requiſite. The barn ought to be of two ſtories, and of a proper width and height, ſo as to hold a conſiderable quantity of unthraſhed corn, and at the ſame time permit the thraſhing-mill to work, without incumbering any of the people engaged in the operation.

It is almoſt unneceſſary to mention the advantage of having barn-floors dry. They are generally formed of clay and earth, with ſometimes a portion of cow-dung. This mixture is worked with water, till it acquires the conſiſtence of mortar; when it is carefully ſpread over the ſurface, to the depth of ſix or ſeven inches; and when attention is paid to cloſe all the cracks and crevices which take place in the courſe of drying, it forms a ſolid compact body. Bricks, however, when laid edgeways on a bed of mortar, and the joints and opens filled up with plaſter lime, make a preferable floor.

In conſtructing a new ſet of farm-buildings, where it is propoſed to uſe a thraſhing-mill to be worked by horſes; the great wheel, inſtead of being covered, as is the common method, by an expenſive ſhed, which anſwers no other purpoſe, ought to be placed in the north-weſt angle of the barn; ſo that the horſe-courſe

ſhould occupy a part of the ground floor of the barn immediately under the machinery, which ought to be ſituated on the upper floor. The horſe-courſe ſhould be ſurrounded by a circular wall, reaching to the joiſts which ſupport the floor above. The eaſt end ſhould alſo be made into two diviſions below the one appropriated for holding the grain, and the other the chaff which comes from the thraſhing-mill through the fanners, and which may be kept entirely ſeparate from each other by paying proper attention to the manner of placing the fanners. Thus, while the unthraſhed corn, and the ſtraw which has paſſed through the thraſhing-mill, remain above, the clean grain drops from the fanners into one apartment below, and the chaff into another.

The lower ſouth end of the barn, as it is unneceſſary for carrying on either of the operations of thraſhing or cleaning the grain, may be converted into

A Harneſs-room and Chaff-houſe.—The one for the purpoſe of keeping ſuch harneſs as was not in common uſe, and the other for holding corn, cut ſtraw, chaff, *&c.* for the horſes. To waſte time in deſcribing the advantages to be derived from having ſuch a houſe, would be ſuperfluous. They muſt be well known to every perſon in the leaſt acquainted with theſe matters.

Stables.

Stables.—The ſtables, it is propoſed, ſhould be placed on the weſt ſide adjoining the ſouth end of the barn, through the gable of which, on a level with the upper floor of the barn, there ſhould be a door entering to the hay-loft, for the convenience of occaſionally carrying ſtraw direct from the thraſhing-mill; and as doors might be made from the harneſs-room and chaff-houſe to enter into the ſtables, theſe laſt could not any where be better ſituated.

The moſt œconomical mode of conſtructing ſtables is, that the horſes heads ſhould ſtand to each end, in place of ſtanding to either ſide wall. A houſe 18 feet in breadth, and 24 in length, will, according to the firſt plan, hold four horſes in each end, and every horſe will have four feet and a half in breadth, including the ſmall ſpace taken up in erecting the diviſions that are commonly placed for the purpoſe of keeping each horſe ſeparate from the others. Were the horſes to ſtand with their heads to the ſide wall, and to have an equal extent of room allowed them, it would require the houſe to be 36 feet in length, making a very conſiderable difference in the expence of building.

Stables ſhould be well ventilated for the ſake of allowing the horſes to breath freely; and alſo for the preſervation of the timber, which is ſoon injured in low, confined houſes, where horſes are kept. All ſtables ſhould be properly

paved

paved in the bottom, and have a gentle declivity to allow the urine to run off. In whatever manner the horſes heads are allowed to ſtand, there ought to be two doors oppoſite to each other, the one for the purpoſe of carrying the dung to the court-yard, and the other for taking out and in the horſes, without conſtantly moleſting the foddering cattle.

Cart-ſhed, Carpenter's Shop, and Granary.—The remainder of the weſt ſide of the ſquare ſhould be converted into a cart-ſhed, with a carpenter's ſhop on the ſouth end; and above the whole, a granary for holding grain. The cart-ſhed will be found very conveniently placed between the ſtables and the carpenter's ſhop; as, while the carts, ploughs, harrows, *&c.* are at hand, when wanted for any operation in the field, they are, at the ſame time, lodged in the moſt proper place for undergoing any repairs that may be neceſſary. The carpenter's ſhop ſhould not only be allotted for the purpoſe of making and repairing implements of huſbandry, but alſo as a ſtore-houſe for ſeaſoned timber, and for ſuch inſtruments as are but occaſionally uſed.

Granary floors ſhould be ſupported by large ſcantlings of oak or fir, as they frequently carry great weights. There ſhould be a free circulation of air in all places for keeping grain, and every precaution uſed ſo as to exclude vermin.

When the ſhed for waggons, carts, ploughs, harrows, rollers, and other large implements, is ſituated below a granary, there ſhould be an opening or two in the floor, large enough to let down a ſack. If this was attended to, the carts might be very conveniently loaded with grain in the ſhed, while the horſes were feeding in the ſtables.

Cattle Shed.—Having now ſketched out how the weſt ſide of the ſquare ſhould be employed, it will be neceſſary to return to the eaſt end of the barn, adjoining to which, may be placed ſheds for the wintering cattle, which ought to occupy the remainder of the northern diviſion. The cattle-ſheds cannot poſſibly be in a more central ſituation, than next to the barn; as by laying a floor of coarſe deals above, and opening a communication with the barn, by a door through the eaſt gable on a level with the thraſhing-machine, the ſtraw could be there ſtowed up with the leaſt poſſible trouble, and remain till uſed, without receiving any injury. The racks could alſo be occaſionally filled with ſtraw; while even in the worſt weather, the perſons ſo employed, could ſuffer no inconvenience therefrom.

By this arrangement, every operation neceſſary to be gone through in thraſhing, cleaning, and meaſuring the grain, is commodiouſly performed; the ſtraw and chaff are alſo depoſited in the moſt convenient places, without any perſon having occaſion

to

to go out under cover; while all that remains is, to carry the grain a few paces diſtant to the granary.

Houſes for fattening Cattle, and holding Turnips, &c.—Next in order, are the houſes to be allotted for fattening oxen or cows, which may not improperly be placed on the eaſt ſide, adjoining to the cattle-ſhed. There is a greater variety in the conſtruction of houſes of this deſcription in Great Britain, than in any others uſed for the purpoſes of huſbandry. Some are built on a very expenſive plan, being ſo broad as to allow two rows of oxen to ſtand with their heads oppoſite each other, and having a gangway of five or ſix feet wide between the mangers. Theſe houſes are, however, chiefly erected at or near large diſtilleries; and the cattle, to the number ſometimes of five or ſix hundred, are fattened on hay, or oil-cake, and grains, and waſh from the diſtilleries. In ſeveral counties in England, where ſtall-feeding is practiſed by the farmers, the houſes are of that breadth, as to allow a gangway before the heads of the cattle, who generally ſtand facing the ſide-wall of the houſe. Between this gangway and the cattle, are mangers for dry food, and troughs for holding water. The cattle are generally fattened on hay, or on oats, with the ſtraw cut in a chaff machine, and ſometimes on oil-cake, being very rarely, but in Norfolk, ſtall-fed on turnips.

nips. In Scotland, except at the diſtilleries, cattle which are houſed, are for the moſt part fattened on turnips, potatoes, or cabbages; the practice of ſtall-feeding with dry food being ſcarcely known in that kingdom.

The beſt conſtructed and leaſt expenſive houſe for fattening cattle, is conſidered to be that where the cattle are ranged with their heads to each end, having a ſmall diviſion of eight or ten feet between every two gable-walls for holding winter roots, cabbages, or other food, upon which the farmer intends to fatten his bullocks. Openings ſhould be made in the wall, oppoſite to each bullock's head; or a ſlip-board fixed the whole length of the gable-walls or diviſions, which can be made to fold up; ſo that the turnips, or other food, can by either of theſe means be put into the ſtalls with very little trouble. The cattle requiring no water, are thus very little diſturbed; and if the houſes where they ſtand are of proper length, the perſon who has charge of them, will have abundance of room to litter and keep them dry and clean.

All houſes where cattle are ſtall-fed, ought to be dry, warm and comfortable, as it is much in favour of the cattle; they ſhould alſo be neatly paved, and the pavement ſo ſloped, that the urine may get eaſily away.

The benefit to be derived from having ſmall houſes for ſtoring up winter food for cows, or ſtall-feeding

feeding cattle; and that theſe ſhould be ſo placed, as to create the leaſt labour in carrying that food to the ſtalls, muſt be ſufficiently obvious, without any farther explanation.

Cow-Houſe.—The cow-houſe cannot be better ſituated, than next to one of the ſtore-houſes for winter food. It is unneceſſary to ſpecify any particulars reſpecting the proper conſtruction of a cow-houſe, beyond what is mentioned in the deſcription of the houſes for fattening cattle, as the accommodation found requiſite in the one, will not be unſerviceable in the other.

It would not be difficult to increaſe the ſize of the ſquare by the addition of ſeveral other houſes; but as theſe already mentioned, if built on a proper ſcale, would occupy a large ſpace, and require the expenditure of a conſiderable ſum, it is intended to cloſe this account, with the deſcription of a

Houſe for Calves,—which ſhould certainly be adjoining to the cow-houſe, either for the convenience of ſuckling, if that is the practice, or of carrying warm milk from the cow-houſe, if the calves are accuſtomed to drink, and are reared in that way on new milk.

The bottom of the houſe ought to be properly laid with ſtones; and a number of ſmall pens ſhould be formed of boards, ſo as to keep each calf ſeparate from the others. This would be found

found of great advantage, whether rearing or fattening is the object.

Poultry-houſes, and Hog's Stye.—Theſe, to render them the moſt convenient, ſhould be placed within a proper diſtance of the dwelling-houſe, and as little connected with the other farm-buildings as poſſible. The leaſt expenſive mode of erecting them, would be by way of *lean to* to the inſide of the ſouth front wall, which it is propoſed ſhould incloſe the ſquare.

The poultry-houſes ſhould be divided from each other, ſo as that the fowls, ducks, turkies, and geeſe, may be kept ſeparate. If this is not attended to, they will not thrive, as they live for the moſt part in a ſtate of warfare.

The hog's ſtye ſhould have an opening to the ſouth, that every kind of refuſe from the kitchen may be conveyed to it without the houſe-ſervants having occaſion to enter the farm-yard. All hogs ſtyes ought to be well laid with ſtones or wood in the bottom, and have a proper declivity; they ought alſo to be divided into a number of pens, according to the ages of the hogs, and the different ſtages of fattening.

Among the great variety of farm-offices, erected in various parts of both kingdoms, there is perhaps none which would afford more accommodation, than thoſe executed upon the plan now deſcribed. The convenient poſition of the barn to the ſtables on the one hand, and the cattle-ſhed

on

on the other, cannot be exceeded; and as the central ſituation of theſe to each other, are the principal objects to be attended to in erecting buildings on a corn-farm, the model or plan which effects that to the greateſt degree, may be juſtly conſidered as neareſt to perfection.

When the requiſite extent of farm-houſes is inadequate to form three ſides of a ſquare of the dimenſions formerly mentioned, the model or plan of building taken notice of by Lord Kames*, ſeems the beſt calculated to afford the greateſt accommodation at the leaſt expence. By this plan, the whole extent of the principal building, ſhould be of two ſtories; and round it, his Lordſhip propoſes to erect ſheds for cattle, and laid to the walls, with roofs ſloping from the eaſing. The ſheds he directs to be made twelve feet wide, and the outward wall ſeven feet high. If this plan is on any occaſion adopted, the great wheel of the thraſhing-mill, ſhould be erected near the middle of the building below, having a harneſs-room and chaff-houſe, on the weſt; and on the eaſt, places for receiving the grain and chaff, as they come from the thraſhing-mill through the fanners, ſimilar to thoſe deſcribed in the preceding account. The ſtable to be placed on the weſt end, and the horſes

* The Gentleman Farmer, page 52, &c.

horſes to ſtand with their heads to each ſide wall. The under part of the eaſt end to be appropriated for holding ſtraw, which may be very conveniently dropt from the floor of the thraſhing-mill, through a trap door made for that purpoſe. The hay-loft ſhould occupy the weſt end of the building above the ſtable. The centre to be ſet apart for holding the unthraſhed corn, and working the thraſhing-mill; and the eaſt end converted into a granary.

The whole ſouth wall ſhould be occupied in ſheds for cattle; and by making a door to enter into the ſtraw-houſe from the ſouth, the ſtraw might be eaſily conveyed where neceſſary. A court-yard for containing the wintering cattle, dung, &c. might be formed by building a ſubſtantial ſtone-wall, to incloſe an area of any dimenſions that may be thought proper. And on the north wall, additional ſheds for implements of huſbandry, carpenter's houſe, &c. might be placed. The writer has never had an opportunity of ſeeing farm-buildings erected on a plan in any reſpect ſimilar to the one above deſcribed; but he is at the ſame time ſatisfied, that for a farm rather under the middle ſize, this plan of building will be found, as has been already obſerved, to afford the greateſt convenience at the leaſt expence.

The propriety of erecting cottages for the accommodation of ploughmen and others, who are

either conſtantly or occaſionally employed in the cultivation of the larger farms, has already been taken notice of. Theſe ſhould be made ſnug, warm, and comfortable, divided properly into apartments; and, where that convenience can be had, paved with bricks. Another circumſtance ought alſo to be attended to, which is but too generally neglected in building cottages in Scotland, namely, to furniſh them with windows of a proper ſize. It is often only neceſſary to ſhew people they are dirty, in order to induce them to adopt habits of cleanlineſs.

With regard to the materials of which farmhouſes ought to be conſtructed, as it is for the mutual intereſt of landlord and tenant, that they ſhould be durable, it muſt be of importance to both, that the materials ſhould be of the moſt laſting ſort. Stone and lime walls, with a covering of ſlate, are certainly preferable to all others. Brick walls ought in every caſe to be ſubſtituted, where ſtone cannot be had, as they are much ſuperior to any that can be formed of wood and plaſter. Where ſlates are not to be procured, reeds or ſtraw are much better for roofing than tiles, although they have not ſuch a neat appearance. Tiles are frequently ſo ill manufactured, that many of them give way after they are put on the roof, the repairing of which is both troubleſome and expenſive: Beſides, unleſs they are pointed with lime both

within and without, and that almoſt every other year, they are the moſt inſufficient roofing that can be put upon a houſe, permitting, very frequently, wind, rain and ſnow to penetrate in every quarter.

It was once propoſed to give an account of the houſes neceſſary according to the ſize of the farm, and the ſyſtem of huſbandry adopted: But in Great Britain at large, both are ſo extremely various, that without going into a minuteneſs, that would be neither entertaining nor inſtructive, it was found impoſſible to convey any uſeful information.

It may be obſerved in general, that though the ſize of the farm, and the ſyſtem of huſbandry adopted, muſt regulate the *extent* as well as the *ſort* of buildings to be erected; yet in order to introduce and carry on ſpirited agriculture, ſufficient accommodation in regard to houſes is neceſſary. Accordingly, it will be found, that in every part of theſe kingdoms, where the proprietors are negligent in furniſhing their tenants with proper farm-buildings, or granting a reaſonable allowance for that purpoſe, agriculture, as well as all the other branches of huſbandry, remain in a languiſhing ſtate. On the contrary, wherever ſubſtantial and commodious farm-offices have been built, whether at the expence of the proprietor or tenant, improvements in agriculture have always ſucceeded.

CHAP.

CHAPTER VIII.

Implements of Huſbandry commonly uſed in Great Britain.

ON the proper conſtruction of the implements uſed in huſbandry, in a great meaſure depends the due cultivation of the ſoil. Without ſuitable cultivation, the ſuperior excellence of ſoil and climate is comparatively of little value. This, therefore, being of the higheſt importance, no pains ſhould be ſpared to render them as perfect as poſſible, for executing the different operations they are intended to perform.

The following is the order in which the implements propoſed to be deſcribed are claſſed:

The plough.
The harrow.
The roller.
Waggons and carts.
The thraſhing-mill.
The fan or fanner.

It

It may not be improper, in this chapter, before deſcribing the implements uſed in huſbandry, to take notice of the different deſigns of plowing, harrowing, and rolling; and of the breadth, form, and poſition of ridges, beſt ſuited to the generality of ſoils: And as the following extract from Dickſon's Agriculture *, on the ſubject of plowing, contains much uſeful information, it cannot fail to prove agreeable to the reader:

Plowing. — "The action of the plough, in "ſtirring and turning over the ſoil, is called "*plowing*. Plowing then ſerves the follow- "ing purpoſes: It increaſes the food of plants, "enlarges their paſture, prepares the vegetable "food for entering their roots, deſtroys weeds, "and removes wetneſs.

"Plowing increaſes the food of plants, by "opening the ſoil to receive the vegetable food "from the air; and by enlarging the ſurface, "thereby expoſing a greater quantity of ſoil to "its influence.

"Plowing enlarges the paſture of plants, by "opening the ſoil, if too ſolid, and making it "firm, if too light.

"Plowing prepares the vegetable food for en- "tering the roots of plants, by reducing vege- "tables

* Dickſon's Agriculture, vol. 1. p. 261.

" tables to a ſtate of corruption, and diſſolving " oils.

" Plowing deſtroys weeds, by making their " ſeeds vegetate, and then tearing up the young " plants, and by expoſing their roots to the " drought.

" Plowing removes wetneſs, by laying up land " in proper ridges.

" It may be ſaid, therefore, that plowing is " one of the moſt important operations in agri- " culture; and that the greateſt care is to be " taken in the performance of it.

" Though plowing in general ſerves all the " purpoſes mentioned, yet commonly one of " them only is chiefly in view; and according " to the deſign in view, the work is to be per- " formed.

" When the deſign of plowing is to increaſe " the food of plants, the ſurface cannot be too " uneven; for the more uneven that the ſur- " face is made, the greater quantity of the ſoil " is expoſed to the influence of the air, and the " greater quantity of food procured *.

" When the deſign of plowing is to enlarge " the paſture of plants, that kind is beſt that " goes deepeſt, (provided the ſoil allows), and " moſt

* The increaſing of the food of plants is often the chief deſign of fallowing, and giving the barley land the winter and ſpring plowing.

" moſt effectually breaks the mould; for the " deeper that the plough goes, the greater quan- " tity of ſoil is employed in vegetation; and " the more effectually that the mould is broken, " the larger is the paſture in the ſame quan- " tity *.

" When the deſign of plowing is to deſtroy " root-weeds, the ſurface cannot be left too " rough, nor the earth of the furrow raiſed " in too large pieces; for the rougher that " the ſurface is, and the larger the pieces of " earth raiſed, the drought has the eaſier ac- " ceſs, and more effectually operates in the de- " ſtruction of the roots.

" When the deſign of plowing is to deſtroy " ſeed-weeds, the ſurface cannot be too ſmooth, " nor the mould too much broken; for the " ſmoother that the ſurface is made, and the " more effectually that the mould is broken, the " ſeeds are the more expoſed to the influence " of the air, the ſap better preſerved, and their " vegetation the more encouraged †.

" When

* The enlarging the paſture of plants is the chief deſign of plowing, when ſeed is to be ſown immediately after.

† The deſtruction of weeds of both kinds is often the end propoſed in ſummer-fallowing, and when the barley-land gets the ſpring-furrow.

" When the deſign of plowing is to remove " wetneſs, the land muſt be laid up in high " and narrow ridges; for the greater number " that there are of furrows, there are the greater " number of drains; and the higher that the " ridges are, the more eaſily the water finds its " way to the furrows.

" Thus we ſee how this operation of plowing " is to be performed, according to the chief " deſign in view. It often happens, however, " that land is in ſuch a condition as to require " more than one of theſe advantages which " *plowing* is intended to promote. Theſe are " ſometimes conſiſtent with each other, and the " land may be plowed in ſuch a manner, as " beſt to promote all of them. Thus land is " ſometimes, and at the ſame time, poor and " wet, and full of root-weeds: Now it may be " plowed in ſuch a manner, as is moſt proper " for increaſing its food, removing its wetneſs, " and deſtroying its weeds; for, by one plow- " ing, its ſurface may be made uneven, which " fits it for receiving an increaſe of food; it may " be formed into narrow and ſteep ridges, which " beſt removes its wetneſs; and the earth may " be raiſed in large pieces, which beſt expoſes " the roots of the weeds to be deſtroyed by the " drought.

" At other times, the land is in ſuch a ſitu- " ation, that the advantages which it requires

" from

" from plowing, are inconſiſtent with each other,
" and it cannot be plowed in ſuch a manner as
" is moſt proper for promoting all of them.
" Thus land, at the ſame time, may be full
" both of ſeed-weeds and of root-weeds: Now
" it cannot be plowed in ſuch a manner as is
" moſt proper to deſtroy both; for, by one plow-
" ing, it cannot be raiſed in pieces, and left
" rough, which is neceſſary to deſtroy root-
" weeds, and have the mould broken and made
" ſmooth, which is neceſſary to deſtroy ſeed-
" weeds. This makes it neceſſary to have one
" of theſe things chiefly in view at firſt, and to
" conſider which of the two it is proper to be-
" gin with, and how the work may be perform-
" ed in ſuch a manner as the other may moſt
" eaſily ſucceed. Thus, in the preſent caſe, the
" land ſhould be plowed, ſo as to be raiſed in
" pieces, and to be left rough; and in that con-
" dition, it ſhould be allowed to lie, till the
" drought may be ſuppoſed to have deſtroyed
" the roots; and then it may be reduced, the
" pieces broken, and the ſurface made ſmooth,
" in order to deſtroy the ſeeds.

" In plowing, there are ſome general rules to
" be obſerved, whatever is the deſign of it.
" Thus, land is never to be plowed when it is
" wet. When land is plowed wet, the deſign
" of plowing, whatever it may be, is fruſtra-
" ted; and this holds true in every kind of ſoil.

" When

" When ſtiff ſoil is plowed wet, by drying " too ſuddenly, it becomes ſo hard, that it can " receive no benefit from the air, and the pa- " ſture in it is entirely ſhut up; root-weeds " ſtrike root again, before the drought reaches " them; and if there are any ſeed-weeds, the " ſurface cruſts ſo ſoon, that they are prevented " from vegetating.

" When light ſoil is plowed wet, though it " may receive ſome benefit from expoſing a lar- " ger ſurface to the influence of the air; yet its " pores being full of water, will prevent its pa- " ſture from being enlarged, and the root-weeds " that are in it will not be deſtroyed; they " will rather flouriſh, by being tranſplanted in- " to a new paſture *. In both kinds of ſoil, " the labour is very ſevere upon the cattle, and " the land is greatly damaged by their going " upon it, and treading it down with their feet.

" Thus it is alſo to be obſerved, that what- " ever is the deſign of plowing, the quantity of " firm land taken off from the ſurface by the " plough in going, ought not to exceed the " wideneſs of the furrow which the plough " makes below. If it does, the land is not " clean plowed; it is only ſcratched, and a

* By light ſoil is here to be underſtood, not ſandy, but ſpungy moſſy ſoil. The ſandy ſoil is in its nature ſo free, and at the ſame time ſo compact, that little alteration can be made in its paſture by plowing.

" quantity of the ſoil is left below untouched
" betwixt every two furrows that the plough
" makes.

" The quantity of firm land to be taken off
" by the plough, depends upon the deſign of
" plowing, and the nature of the ſoil.

" When the deſign of plowing is to increaſe
" the food of plants, and deſtroy root-weeds,
" whether the ſoil is ſtiff or light, as great a
" quantity may be taken off as the plough can
" take conveniently; becauſe the greater that
" the quantity is which the plough takes off,
" the rougher and more uneven the ſurface is
" made; and the rougher and more uneven that
" the ſurface is made, the more food is procu-
" red, and the root-weeds more effectually de-
" ſtroyed.

" When the deſign of plowing is to enlarge the
" paſture of plants, and deſtroy ſeed-weeds, though
" a large quantity may be taken off in light ſoil,
" that naturally falls in pieces when turned over,
" yet a ſmall quantity ought to be taken off in ſtiff
" land that is not ſo eaſily reduced, becauſe the
" ſmaller that the quantity is which the plough
" takes off, the ſoil is the more effectually broken,
" and the ſurface made the ſmoother; and the more
" effectually that the mould is broken, and the
" ſmoother that the ſurface is made, the paſture
" is the more enlarged, and the weeds more ef-
" fectually deſtroyed. This is agreeable to the
" ordinary practice, introduced no doubt from

" experience; for we find, that a much leſs " quantity is taken off when land gets the ſeed- " furrow, the chief deſign of which is to en- " large the paſture, than at any other plowing."

Harrowing.—The operation of harrowing is performed for the purpoſe of ſmoothing the ſurface after plowing; and the chief deſign is to cover the various kinds of grain and other ſeeds when ſown. Harrowing is alſo the moſt effectual mean hitherto diſcovered for cleaning the ground of all kinds of weeds.

Every intelligent farmer knows the advantages reſulting from having the ſurface made ſmooth, and the mould properly broken and pulveriſed after ſeeds are ſown, as thereby the ſeeds derive greater nouriſhment, and the moiſture is more effectually retained. It is obvious, that ſtrong land requires more harrowing, in order to reduce it to a pulveriſed ſtate than lighter ſoils; but as all ſoils are rendered more firm and ſolid by harrowing, the leſs a ſtrong ſoil is harrowed, if the intention is anſwered, the better. On the other hand, light ſpungy ſoil, eſpecially where there is any portion of moſs, being rendered more compact and retentive of moiſture by harrowing, this kind of land can ſcarcely get too much.

After ſeed is ſown, the common method of harrowing is firſt along the ridges, then acroſs, and then along again. When the ridges are level, or nearly ſo, they may be harrowed either way

way as the farmer may find moſt convenient, it being of little conſequence whether the harrow go firſt acroſs or along the ridges of a well-plowing field in proper tilth; but if the ridges are raiſed in the middle, and the land indifferently plowed, it would be highly improper to begin by harrowing acroſs, as thereby a conſiderable ſhare of the ſeeds would fall into the bottoms of the furrows, and be prevented from vegetating.

When the intention of harrowing is to tear up the root-weeds, which have been in ſome degree looſened by the previous plowing, the harrows will do much more execution, by going in an oppoſite direction to that in which the plough went, as the tines or teeth will tear up a greater quantity of the roots, than if the harrows followed in the ſame track with the plough.

When harrowing is performed for the purpoſe of deſtroying ſeed-weeds, the ſurface ſhould be made ſmooth, and the ſoil as much reduced as poſſible. The ſeeds near the ſurface will, by this means, vegetate with more freedom, and in greater abundance, and thereby a ſecond or third harrowing, or a ſubſequent plowing and harrowing, will have much more effect in cleaning the field.

There is another circumſtance in regard to harrowing, which, as it is frequently of very material importance, ought not to be omitted. It often happens, that after a field has been properly

perly ſummer-fallowed, manured, and prepared in the beſt manner for ſowing wheat, the farmer is prevented from ſo doing by heavy falls of rain. Though no water may appear on the field, yet it is rendered ſo poachy, that he cannot put on his horſes, for the purpoſe of harrowing in the ſeed, and that circumſtance alone prevents him from ſowing his wheat in due ſeaſon.

In ſome parts of Scotland, a method has been tried to remedy this inconvenience; which, when the ridges are ſtraight, and not over broad or too high raiſed on the crown, has been found to anſwer beyond every expectation that could be formed. It is as follows: An axle, equal in length to the breadth of the ridge, is fixed on two cart-wheels; and to this axle is chained as many harrows as will cover the breadth of the ridge. To each of the ends of the axle two horſes are yoked, and made to walk along in the furrows of the ridge; the wheels turning eaſily round, and following the horſes in the furrows: the horſes feet are, by this expedient, prevented from doing any injury, and the ſeed is as effectually covered as in the ordinary way. The only additional circumſtance neceſſary to be mentioned, is, that the harrows ſhould not be turned ſhort at the end of a ridge. In order to avoid confuſion, it is better to go along one ridge, and return by another, which may be done as often as is judged requiſite for harrowing the field ſufficiently.

Rolling.

Rolling.—The practice of rolling land has been long eſtabliſhed in England, and of late years has been very generally introduced into Scotland.

Every implement that tends to pulverize the ſoil on which graſs-ſeeds are ſown, muſt be beneficial. Graſs-ſeeds ought to be ſown ſo as to lie near the ſurface, otherwiſe they will not vegetate. If they are ſown upon a rough field, where the ſoil has not been properly reduced, they will vegetate but partially. Rolling on every occaſion when graſs-ſeeds are ſown, muſt be greatly in favour of the ſucceeding crop of graſs. It ſmooths and conſolidates the ſurface; by which means, moiſture, ſo eſſential to the vegetation of all ſmall ſeeds lying near the ſurface, is preſerved; and as the firſt crop of graſs is generally made into hay, or uſed as green food for the working cattle, a ſmooth level ſurface for the ſcythe to go over, is thereby obtained. Rolling in the end of harveſt, and beginning of ſpring, is alſo advantageous on thoſe wet ſpouty ſoils, which are apt to throw out the young plants of graſs, eſpecially after froſt, as, by being preſſed down, the roots thereby acquire a firmer hold of the ground. And all graſſes are ſaid to ſpread, or ſtool (tiller) better, in conſequence of being rolled.

All light ſoils in tillage, whatever kinds of ſeeds are ſown, ought to be rolled, for the ſame reaſon that

that harrowing ſuch lands to a great degree is recommended, namely to render it as firm and ſolid as poſſible. When the ſoil is ſtrong and adheſive in its nature, the roller may be applied with much propriety betwixt the harrowings, as it will not only reduce many of the clods, but preſs down others, which will be gradually diſſolved by the natural fermentation of the ſoil.

It has been obſerved, when treating of plowing, that when the intention was to deſtroy root-weeds, the lands ſhould be left as rough as poſſible. On the other hand, that when the deſtruction of ſeed-weeds was the object, it could ſcarcely be made too fine. Rolling in either caſe is uſeful; in the firſt, it gives the harrows the greater power in reducing the ſoil; and in the ſecond, by making the mould fine, and the ſurface firm and ſmooth, the ſap is preſerved, and the ſeeds will vegetate more freely.

If no other benefit was derived from rolling lands in tillage than ſmoothing the ſurface, even that in harveſt, is of material conſequence; more eſpecially, where the crops are cut down with the ſcythe, as is common over a great part of England; and which, in conſequence of the increaſing ſcarcity of labourers, is a method that will, in all probability, be ſoon introduced into Scotland.

Ridges.—In various parts of Great Britain, and eſpecially in the more fertile and populous diſtricts,

diſtricts, the ridges are remarkably crooked, unequal in breadth, and made to riſe towards the middle, or crown, to the height of ſeveral feet above the furrows on either ſide. It is obvious that theſe are formed in the worſt manner, to anſwer the purpoſes which are now intended by dividing a field into ridges. It is not, however, to be ſuppoſed, that this could have eſcaped the obſervation of all the farmers of former times. On the contrary, from the practice having been ſo general, it is more than probable that this form of ridges, which is now conſidered as abſurd, was once deemed, like many other ancient practices, an improvment*; for, on many of the hills in Scotland, where the lands are dry and tolerably level, and where cultivation

* The tenants being ſtill bound to grind all their corns at particular mills, and to work all their iron-work at certain ſmiths ſhops, as is common in many parts of Scotland, are now conſidered, and juſtly, as grievances. At the ſame time, there is every reaſon to believe, that theſe regulations originated in a deſire to introduce improvements. A proprietor, in ancient times, did not think it prudent to run the riſk of building ſuch a novel machine as a corn-mill was then conſidered, or to erect a forge, and engage a blackſmith from a diſtant part of the country to ſettle on his eſtate, unleſs the adjoining proprietors agreed to ſupport ſuch meaſures. They therefore came under obligations, that their tenants ſhould grind their corns, and manufacture all the iron-work which they required, at theſe particular places.

tivation had no doubt taken place at the earlieſt period, although now abandoned to the growth of heath, (ling), the ridges are as ſtraight as any in the beſt cultivated parts of the iſland. The reaſons which induced the farmers of former times to form the ridges in the manner which now appears ſo objectionable, may be explained in the following manner. When the lands were generally cultivated in the open field, or run-ridge ſtate, the furrows of the ridge were commonly the march between one farmer and another. The portion of land belonging to each tenant in any one place was thus ſo ſmall, as to prevent him from uſing any other method of draining, than that of raiſing the ridge ſo high as to allow the water to run off in the furrows, without doing damage to the crop. All the ridges which are broader at one end than the other, will generally be found narroweſt at that end of the ridge which is ſtill moſt wet and ſpouty. It is, therefore, more than probable, that the ridges were purpoſely made narrow at that end, as the only means by which lands ſo poſſeſſed could be drained. As the moſt crooked ridges are on ſteep and ſloping grounds, it may be preſumed, that prudence directed the firſt cultivators to adopt that poſition of ridges, in order to prevent the ſoil from being waſhed away by ſudden falls of rain; which would no doubt have been the caſe to a greater degree, had the

ridges been all ſtraight. Each furrow becoming a ſmall rivulet, and having nothing to impede its courſe, muſt have done more injury to the ſoil than if it had run off in the circuitous courſe formed by the crooked ridges.

The mode of poſſeſſing lands being now happily altered for the better, (except in the open field pariſhes in England), every proprietor and tenant has it in his power to drain the lands, and form the ridges in ſuch manner as they may judge moſt beneficial. Theſe old faſhioned ridges, which can be approved of only in the circumſtances before mentioned, are not only rendered unneceſſary, but, in their preſent ſtate, operate as a bar to the complete improvement of the ſoil. There is, however, no buſineſs in which the improving farmer can be engaged, that requires more ſkill or caution, than levelling and altering the direction of ſuch ridges.

When the ſoil is either clay, or ſtrong loam inclining to wet, the expence added to the failure of crops, which generally enſues for a number of years, will be found, in almoſt every inſtance, to exceed the profit that can be derived from neat, ſtraight, well formed ridges. Many inſtances might be adduced in ſupport of this aſſertion, even when the work has been performed with all the ſkill and attention which the moſt expert farmers could beſtow. And it may be taken for granted, that levelling high ridges of ſuch

ſuch ſoils with the plough is ſcarcely poſſible, without running riſks that no prudent farmer, on a leaſe of ordinary endurance, would chuſe to hazard. When that operation is, however, thought proper, performing it with the ſpade is probably the leaſt expenſive mode, and beyond all doubt the ſafeſt and moſt complete, as the ſurface-ſoil may, by that means, be ſtill kept above, and the future crops can ſuſtain little or no injury from the alteration. If the ſoil is dry, light, and friable, the ridges may be levelled with the plough, without danger of materially injuring the ſucceeding crops. It is, however, neceſſary to avoid too much precipitancy in levelling and altering high ridges, even in ſoils of this deſcription; becauſe, if it is done without proper care and attention, the ſurface-ſoil, in ſome parts of the field, will be covered with ſuch a depth of ſubſoil, as to prevent vegetation for ſeveral years. The beſt time for levelling ridges is when the land is under a courſe of ſummer-fallow. Then the higher parts may be ploughed frequently, and in in ſuch various directions as will beſt anſwer the double purpoſe of reducing the heights, and filling up the hollows.

When the ridges are only a little raiſed in the middle, but lying in various ways, ſo as to render an alteration neceſſary, the field may be made ſufficiently level, by ſpliting or cleaving the ridges two or three times; that is, beginning

at

at the furrows and ploughing to the crown; ſo that, while the old furrows are conſiderably raiſed, a large hollow is made in the crown, which being filled up by two or three furrows from each ſide, tends to bring the whole to a level.

The breadth of modern ridges, in almoſt every diſtrict, even in ſimilar ſoils, varies exceedingly; and theſe of all the different ſizes from two yards to ten, have their advocates; but that which is moſt generally approved, and of courſe moſt commonly adopted, is ſix yards, or eighteen feet. Ridges of this breadth are eſteemed the moſt proper, for the following reaſons: They are found to anſwer every purpoſe of drainage that can be obtained by open furrows: They are of the moſt convenient ſize for ploughing, as the breadth at the end is not more than neceſſary for turning the horſes. A man can ſow the ſeed by going once along one ſide of the ridge, and returning by the other; an operation which requires more labour, when the ridges are either conſiderably more or leſs than the breadth above mentioned. The harrowing is performed more expeditiouſly than on ridges of any other dimenſions; for when three harrows are worked together, once going round takes in the whole ridge: And, laſtly, ridges of this ſize are found very convenient in harveſt, allowing four reapers to work commodiouſly, without interfering with

one

one another. It is therefore obvious, that where particular cauſes do not render ridges of other dimenſions requiſite, the breadth above mentioned is preferable to any other.

When the ſoil is dry, the ridges may be formed as flat as the farmer inclines, without any bad conſequences reſulting therefrom; but when it has a tendency to wetneſs, the ridges ought to be in ſome degree convex, forming a ſegment of a large circle; by which means, the field will be kept completely dry, every furrow will operate as a drain, and a greater extent of ſurface will at the ſame time be expoſed.

In regard to the proper poſition of ridges, where it is not neceſſary on account of drainage, or for ſome other other important purpoſe, to give them another direction, they ſhould be all formed as nearly north and ſouth as the ſituation of the grounds will permit. By this poſition the ſoil is more generally expoſed to the influence of the ſun and air; a circumſtance, the importance of which may be beſt elucidated by the following quotation from Marſhall's Rural Oeconomy of the Midland Counties *: "It is obſervable, that ſhucks (in Scot-"land called ſtooks), ſhould be ſet up north and "ſouth, and not eaſt and weſt; for in this "caſe the ſheaves on the north ſide are ſeveral "days

* Vol. II. p. 18.

" days later, in reſpect of the fitneſs of carrying,
" than thoſe of the ſouth ſide.

" I write from the experience of this year,
" when I have alſo had an opportunity of ob-
" ſerving a ſtriking inſtance of the evil effect
" of ridges lying eaſt and weſt, the corns on the
" ſouth ſides of the ridges (not high ones) ſhot
" into ear, changed and ripened a week at
" leaſt earlier than that of the north ſides.
" At the time of reaping, the wheat on the
" ſouth ſides was, in ſome patches, too ripe,
" while that on the north ſides was in many
" places literally green."

The Plough.—There is no machine that has contributed more to the utility of mankind in all ages than the plough. It has been the principal ſupport of every civilized nation from the earlieſt period; and we find the Roman people, who were the beſt farmers, as well as the greateſt conquerors, were particularly attentive to the conſtruction of this uſeful inſtrument. In modern times, although ploughs may be ſaid to be the moſt common implements uſed in huſbandry, yet the conſtruction is frequently imperfect, and the mechaniſm, on proper principles, very little underſtood. The ploughs uſed in theſe kingdoms differ materially from each other, but all have their admirers, and, no doubt, in ſome inſtances, poſſeſs properties peculiar to themſelves.

There

There is a great variety of ploughs in uſe in England; but as the variation in many caſes originates in the whim or ignorance of the carpenters, (no fixed rules being laid down for making them), rather than on the general principles on which they are conſtructed, it is propoſed only to take notice of ſuch as are materially different from each other, beginning with

The Common or Old Plough.—Of this inſtrument, it is neceſſary to ſay, that it is long, heavy, and unweildy, put together in general in a very clumſy manner, having a maſſy beam, ſhare, and mould-board, and requiring four, five, and ſometimes ſix horſes, to work it. This plough, with all its faults and imperfections, is uſed by the majority of farmers in almoſt every county in the kingdom.

Rotheram Plough.—The Rotheram, or, as it is ſometimes called, the Dutch plough, which is common in ſome of the northern counties, was firſt conſtructed by a Mr Joſeph Foljambe, about ſeventy years ago. It is very different from the old common plough, light, neatly conſtructed, and eaſily worked; the coulter and ſhare being formed and placed, ſo as firſt to raiſe a little, and then gradually turn over the new cut furrow, much cleaner and with leſs reſiſtance than the former. It is not only capable of being worked with two horſes a-breaſt, as is common in Northumberland, but does the work better

than when three or four horſes are yoked in a line, which is the too general practice in ſome parts of Yorkſhire.

The Norfolk Plough,—Is extremely ſingular in its conſtruction; and what is not leſs remarkable, is in a great meaſure confined to that county, there being probably more ploughs of that ſort in uſe in Kincardine-ſhire in Scotland, than in all the other diſtricts of Great Britain beſides Norfolk. The peculiarities of this plough are, that the beam is made to reſt on an axle-tree, which is ſupported by high wheels; the ſock or ſhare is uncommonly broad, and blunt at the point; one handle only is deemed neceſſary; and the whole tackle is more complex than that of any other plough in the kingdom. With all its ſingularities, it ſeems well adapted for cultivating the Norfolk ſoil; as a man with two horſes without a driver does more work, and to greater perfection, than is done in the ſame ſpace of time in any other county in England, even when two men, or a man and a boy, and five or ſix horſes, are employed.

Double Plough.—This plough is conſtructed for the purpoſe of turning over a double furrow. One plough is fixed to the ſide of another, ſo as, with two men and four or five horſes, two furrows are turned over at the ſame time. The ends of the two beams are fixed to the axle of the wheels, by which means the machine

chine acquires ſo great a degree of ſteadineſs, that very little ſkill or attention is required in the perſon who holds it. This kind of plough is getting every day more and more into general uſe in various parts of England. But it may be conſidered rather as an apology for the want of two horſe ploughs, than as an inſtrument well adapted to the purpoſe for which it is intended.

There are ſeveral other ſorts of ploughs in England that have wheels, beſides the two above mentioned. Some of them have one, and others two. Reſpecting wheel-ploughs in general, in the opinion of the writer, Lord Kames's obſervation is well founded; that all complicated ploughs are baubles; the pivots of the wheels are always going wrong; and beſides, they are frequently ſo choaked with earth, as to increaſe the friction, inſtead of diminiſhing it*.

It will be allowed, that in the hands of an ignorant ploughman, theſe implements are preferable to the ſwing ploughs, however well conſtructed; as the wheels give them a ſteadineſs of motion, which renders ſkill in the ploughman leſs neceſſary. But this cannot with propriety be urged as a ſubſtantial reaſon in their favour: For if any one plough, *of ſimple conſtruction*, is aſcertained to be ſuperior to all

* See the Gentleman Farmer, p. 7.

others for general work; as is the caſe with reſpect to Small's plough in Scotland, which will be afterwards taken notice of; it requires only a little perſeverance on the part of the farmers, (as the experience of a few years has fully proved in that kingdom), to bring it into common uſe. On the other hand, if a plough is complex, and difficult to be put and kept in order, it is not probable it will ever be generally introduced.

The Norfolk ſyſtem of turnip-huſbandry has ſpread over almoſt every part of the iſland; but the Norfolk plough, except in the particular inſtance above mentioned, may be ſaid to be confined to that county. The beſt reaſon which can be aſſigned is, its being ſo complex in its conſtruction, that none but ſuch as have been long accuſtomed to ſuch ploughs can manage them to advantage. For the ſame reaſon alſo, in the hands of unſkilful ploughmen, they are conſtantly going wrong, ſo that the repairs become both troubleſome and expenſive.

Every invention that tends to reduce the price of cultivation, without leſſening its efficacy, will be readily admitted as an improvement. It is on this principle, that the double furrow plough has come of late into ſuch general uſe; although from the account which Mr Marſhall gives, as well as from what the writer has ſeen of it himſelf,

ſelf, he is by no means diſpoſed to conſider it as an eſſential improvement. On ſtraight even ridges, and level ground, the double plough makes very good work; but wherever the lands are crooked, or are wider at one end than the other, or the ground lies in hills and hollows, ſuch work is frequently made, as good ploughmen would, and as every farmer ought to be aſhamed of *.

The Rotheram plough, owing moſt probably to the ſimplicity of its conſtruction, is more generally uſed in England than any other of modern invention; and where one plough only is neceſſary, and the method of ploughing with a man and two horſes without a driver, is propoſed to be introduced, it is certainly ſuperior to any in that kingdom. This plough has been greatly improved of late, by the perſevering attention of John Bailey, Eſq; ſteward to the Earl of Tankerville at Chillingham, in the county of Northumberland.

Mr Bailey having had the goodneſs to ſend the writer a drawing of one of theſe improved ploughs, a copy of it is hereto annexed; and the following, which are his directions for determining the poſition and dimenſions of the moſt eſſential parts of a plough, are by his permiſſion inſerted.

That

* Marſhall's Rural Oeconomy of the Midland Counties, vol. i. p. 140.

That the operation of ploughing may be performed with the leaſt loſs of power, it is neceſſary to know the height and inclination of the horſes' ſhoulder.

While a horſe is in the act of pulling, the inclination of his ſhoulder varies from 69 to 75 degrees, according to circumſtances, the medium is 72 degrees; and the medium height of the point of draught on the ſhoulder of a horſe 15½ hands high, is 48 inches.

Theſe *data* being got from experiment, and the depth to be ploughed (ſuppoſe 6 inches) given,

Draw a right line A B, and at any point A erect a perpendicular A P, equal to 48 inches.

With A P as a radius, from P as a centre, deſcribe a quarter of a circle A Q, which divide into 90 equal parts or degrees.

From P, through 72 degrees, draw a right line to meet A B in B.

Set the length of the traces and ſwing-trees from P to H; this is commonly 102 inches.

From H, upon A B let fall a perpendicular H I, which meaſured on the ſcale that A P was taken from, will give the height of the beam H I, 16½ inches *.

Then

* This is the height when the iron ſole clout is on, which, being ¼ of an inch thick at the heel, and ¼ at the fore-end, gives room for floating the ſock-point to

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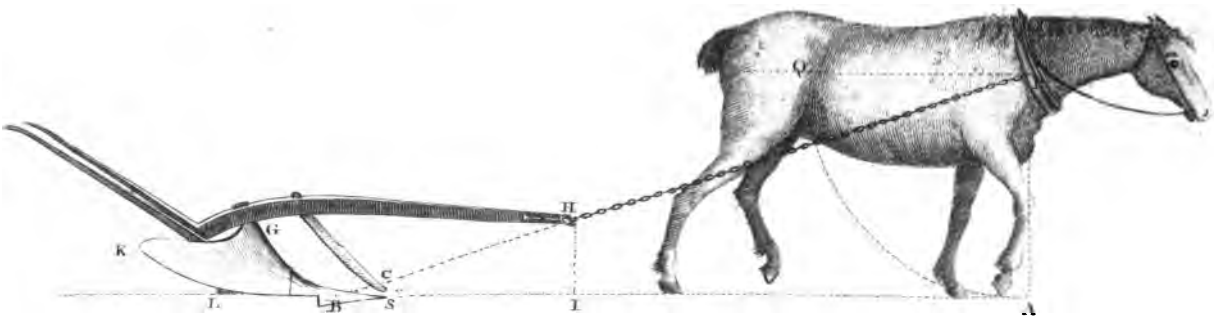

Then at the diſtance of half the depth the land is intended to be ploughed, (ſuppoſe 3 inches) draw a line parallel to A B, and from C, where it interſects P B, let fall a perpendicular upon A B to S, which will give the point of the ſock; and a line drawn through C, making an angle of 45 degrees with B A, will be the poſition of the fore edge of the coulter.

The heel of the plough will be got by ſetting the length of the ſole 36 inches from S to L.

The length of the beam will be determined by taking the diſtance from H to any fixed point as S, or B, or L, and applying it to the ſcale of equal parts in this caſe.

H S will be 44.6 inches.
H B —— 53.4 ditto.
H L —— 79.0 ditto.

The form of the mould-board, which is of caſt iron, is ſuch, that the ſod to be raiſed preſſes equally againſt it in every part, from the ſock-point S, to where it leaves it at K; it alſo differs from other mould-boards in not beginning to take its riſe from the bottom oppoſite to the heel L, but at leaſt 12 inches farther forward towards the ſock, and in being cut away at the bottom oppoſite the heel L, about 3 inches high (from the ſole), by which the turning of the ſod is

go deeper or ſhallower; of courſe the carpenter ſhould have the height of the beam only 15¼ inches from the line of the wood-ſole.

is much facilitated *. Theſe ploughs, wherever they have been tried, have fully anſwered expectation, being allowed by all who have ſeen them properly at work, to go with more eaſe to the horſes than any other.

The beſt mode of applying the draught, and what is generally adopted in Northumberland, is by two horſes abreaſt, which are found from experience ſufficient for ploughing the ſtrongeſt lands, and will in general plough more than an acre a-day.

In

* For the demonſtration of the principles from which the above conſtruction is derived, as well as the inveſtigation and practical directions for making the mould-board, and finding the curve of the breaſt G S, with many other particulars, reference muſt be had to an eſſay of Mr Bailey's, publiſhed for Meſſrs Robinſon, London, entitled, "*An Eſſay on the Conſtruction of the "Plough, deduced from Mathematical Principles.*" In that eſſay, Mr Bailey has aſcertained one very important point, namely, what proportion the breadth of the furrow ſhould bear to the depth, ſo as to expoſe the greateſt extent of ſurface. When the ſod makes an angle of 45 degrees with the horizon, the greateſt extent of ſurface is expoſed. When the ſods are turned over, and laid at the angle of 45 degrees, the proportion between the width and depth will be as follows:

The width of the furrow being

10 inches,	the depth will be	7.0 inches.
9		6.3 ditto.
8		5.6 ditto.
7		4.9 ditto.

In Scotland, till within theſe 40 years, the plough almoſt univerſally uſed was, what is known by the name of

The old Scotch Plough;—which, as it is commonly conſtructed, is a clumſy heavy machine, meaſuring between twelve and thirteen feet, from the handles to the extremity of the beam. The length of the head * including the ſock, is near four feet. The ſock is very different from any other uſed in Great Britain, being about two feet in length, high in the middle, and round in the ſides, without any fin or feather, and terminating in a ſharp point. The mould-board alſo, in place of being curved, is quite ſtraight, forming an angle with the ſock or ſhare. This implement is well contrived for breaking up ſtiff rough ground, incumbered with weeds and ſmall ſtones, ſuch as the lands of Scotland generally were at the time this plough was moſt in uſe. The principle on which it is conſtructed, is entitled to approbation; for, in ſuch ground as above deſcribed, it performs the operation much more completely, than can be effected with any plough of modern invention. This kind of improvement is now

* That part of the plough called the *head* in Scotland, is made of wood. In many parts of England, it is made of iron, of one piece with the ſock, and is called the ploughſhare.

now to be found only in the remote parts of the kingdom, where improvements have been but very partially introduced; and being made by ignorant country carpenters, it is very different from what the ſame kind of machine would be if conſtructed on proper principles. By the want of a due proportion in all its parts, the friction is much increaſed, and greater ſtrengh, of courſe, neceſſary to move it. The Scotch plough was formerly drawn by four horſes, or four oxen and two horſes; but more frequently, (as is the preſent method where this kind of plough is uſed), by ſix, eight, and ſometimes ten oxen yoked in pairs.

Small's Plough.—The only other plough in general uſe in this kingdom, is called Small's plough, from the name of the perſon by whom it was invented about thirty years ago. It is a neat, light, well-conſtructed implement. The ſock is made with a fin or feather, whereby the firm earth in the bottom of the furrow is cut, and moved more eaſily and completely than could be done by the ſock of the common plough. The mould-board, which is for the moſt part now made of caſt iron, is gently curved, ſo as to throw the furrow off with the leaſt poſſible reſiſtance. It is, upon the whole, probably one of the beſt conſtructed ſwing-ploughs for all ſort of ſoils in a proper ſtate of cultivation, *in common uſe* in the iſland. With this plough,

a man and two horſes abreaſt without a driver, will plough above an Engliſh acre a-day, and not diſtreſs himſelf or the horſes.

There is perhaps no particular in the mode of conducting the huſbandry of the two kingdoms, in which there is ſo great a difference, as in the number of horſes which the farmers deem neceſſary to employ in the plough.

To a Scotſman, who has been in the daily habit of ſeeing all kinds of ſoils, plowed in the moſt complete manner, by a man with two horſes yoked to a common, light, ſwing plough; nothing can appear more abſurd, than two men, with four, five, or ſix large ſtrong horſes in a line, drawing a ponderous unwieldy machine, in the lighteſt ſoils of Middleſex or Surry. There are many obſtacles to the general improvement of agriculture, and the due cultivation of the ſoil, which farmers have not in their power to remove; but to purchaſe proper implements, and to proportion the number of horſes to the eaſe or difficulty of accompliſhing the different operations, is in every one's power. It therefore appears ſurpriſing, that ſo great a proportion of that reſpectable body of men, the Engliſh farmers, ſhould remain wedded to ancient cuſtoms and prejudices. As a ſpirit of enquiry reſpecting agricultural improvements, has, however, gone abroad, it is hoped they will turn their attention to learning the practices of other diſtricts;

and as they poſſeſs too much good ſenſe not to adopt ſuch, as upon due examination they find beneficial; there is no doubt, that the uſe of two horſe ploughs, which on trial muſt be found eſſentially to promote their intereſt, will be generally introduced *.

The harrow,—is the inſtrument uſed for collecting the weeds, and ſmoothing the ſurface of the land after plowing. There are only three kinds of harrows in common uſe in England, *viz.* the brake, the double, and the ſingle harrow; and theſe only ſhall be deſcribed.

The brake, or large heavy harrow, conſiſts of four bulls in each of which there are five or ſix tines or teeth. It is frequently uſed after ſeed is ſown, and before the lighter harrows are introduced. This implement is alſo extremely uſeful for reducing rough ſtrong land, and for looſening couch-graſs, and other root-weeds, in the courſe of a ſummer-fallow. The brake is commonly drawn by three or four horſes; but in ſome diſtricts, by two horſes and two oxen.

The double harrow,—is formed by joining two harrows of the ordinary ſize together, by means

* As it is propoſed to make ſome obſervations on drill-huſbandry in a ſubſequent chapter, notice will then be taken of ſome of the implements which are uſed by thoſe who adopt that ſyſtem.

means of crooks and loops; each has four bulls, and fix tines in every bull. It is in very general uſe in ſome counties, and ſupplies the place of the common harrow, but is not ſo eaſily worked, requiring frequently three horſes.

The ſingle or common Harrow,—is ſo well known, that little deſcription is requiſite. It is lighter in the conſtruction than any of the two former, being eaſily worked by a ſingle horſe. Theſe harrows have the ſame number of bulls and tines as laſt mentioned; and in regard to the manner of working them, it will be afterwards taken notice of.

The harrows formerly uſed even in the better cultivated parts of Scotland, were like all the other implements of huſbandry then in uſe, very inſufficient for effecting the pupoſes for which they were intended. They had two, three, and ſometimes four bulls, in which were placed a certain number of timber teeth, according to the ſize of the frame. Where better modes of huſbandry were introduced, implements of ſuperior conſtruction were found requiſite. Theſe harrows gave way to others which were nearly of a ſquare form, having four bulls and five ſhort light iron teeth in each. Harrows of this deſcription, may be ſaid to be in general uſe at preſent over the greateſt part of this kingdom; but on the ſouth-eaſt coaſt, the kind of ſingle harrow which is common in ſeveral counties in

England, is every where to be ſeen. The brake or large harrow, is alſo uſed in many parts of the kingdom, and is found of ſingular uſe in reducing ſtrong obdurate ſoils, and rough heathy grounds, which had never before been brought under cultivation.

In ſome diſtricts in both kingdoms, ſmall light harrows, with ſhort tines ſet pretty cloſe, are uſed for harrowing in graſs-ſeeds. This method is not, however, ſo generally practiſed as it ought to be. On lands in proper tilth for receiving graſs-ſeeds, theſe harrows not only make the mould finer, but alſo cover the ſeeds at a more proper depth, and in a more complete manner, than can be done with thoſe of the ordinary ſize.

When the common ſingle harrows are uſed, a man drives three horſes, and every horſe draws his own harrow. Theſe are prevented from getting above one another, by placing a bar of wood acroſs, provincially called *a lay-over*, or by a piece of crooked timber fixed to the outſide bulls that are contiguous to each other, which prevents the harrows from ſtarting up, and keeps them in their proper places. Three harrows joined together in the manner above mentioned, or by any other means uſed to prevent them from getting out of their places, is the beſt manner in which they can be worked. A man with three horſes and three harrows, will do nearly,

if

if not fully as much work, and to as good purpoſe, as four horſes in pairs and two men, are able to perform. This, no doubt, is a ſtrong argument againſt uſing double harrows; and whoever will fairly try the experiment, will be perfectly ſatisfied of the fact.

The Roller,—is an implement frequently uſed for ſmoothing the ſurface of land in tillage. There are ſeveral kinds of rollers in common uſe in theſe kingdoms. Some are made of ſtone; others of a log of wood; and others again, are formed by nailing thick boards upon three ſmall wheels, one placed in the middle, and one at each end. The only material difference in rollers is in the weight; on ſome ſoils lighter, and on others heavier rollers are required; but it ſhould be attended to, that when a roller is made large in the diameter, the weight ought to be the greater; for, the larger the diameter, a greater part of the ſurface of the roller will reſt upon the ground: Therefore, without additional weight in proportion to its ſize, it will make little impreſſion. The weight of a roller ought, for this reaſon, to be proportioned to the diameter. To remedy this inconvenience, which cannot always be avoided in making rollers, they ſhould be ſo conſtructed, as to have boxes fixed to the frame, as is ſometimes the caſe; ſo that any additional weight may be added, according to the nature of the ſoil which it is intended to roll.

All

All the kinds of rollers above mentioned, as they do not move upon their axis, but are dragged along the ſurface, frequently making a deep rut in turning, till they get again into the line of draught, are with difficulty turned at the end of the ridge. In order to prevent this heavy pull to the horſes, a kind of roller has been conſtructed, and is pretty generally uſed, having a diviſion in the middle, like two ſhort rollers joined together; by this contrivance, the rollers go very eaſily when turning, both the parts moving round their axis, the one forward and the other backward.

Rollers are frequently drawn in England by two or more horſes in a line; but the more approved and general mode is, to yoke two horſes abreaſt, which, when the ridges are of an ordinary level, is perfectly ſufficient on any kind of ſoil.

Waggons and Carts.—Although neither theſe, nor the machines after mentioned, are employed in the cultivation of the ſoil, and therefore cannot, ſtrictly ſpeaking, be denominated implements of agriculture; yet no apology is neceſſary for introducing a deſcription of them in a work of this nature.

The waggons uſed in the operations of huſbandry in England, (for in Scotland there is none), are of various ſizes, forms and dimenſions. Thoſe in Glouceſterſhire, as mentioned by Mr Marſhall,

Marſhall, ſeem preferable to any others in that kingdom. By means of a crooked ſide rail, bending archwiſe over the hind wheel, the body or frame of the waggon is kept low, without the diameter of the wheels being leſſened. The body is alſo wide in proportion to its ſhallowneſs, and the wheels run ſix inches wider than thoſe of moſt other waggons, whereby its advantages in carrying a top-load are obvious. Such as are uſed in the midland counties, he deſcribes in the following words: "The waggon is noticeable on account of its aukwardneſs, clumſineſs, unwieldineſs, and altogether, in the preſent ſtate of roads, its unfitneſs for a *farmer's* uſe. Its weight, (with narrow wheels), from a ton to twenty-five hundred weight. Its height with the "*geering*" on, ſeven or eight feet (when empty). The length of the body, fourteen or fifteen feet; from tug to tail, twenty or upwards. The height of the fore wheels, four feet nine or ten inches, without any inſection in the body of the waggon! No wonder it ſhould require near an acre of ground to turn it on, and a horſe or two extra to draw it.

"The gawkineſs of its conſtruction originated, no doubt, in the depth of the roads at the time it received its preſent form; a tall waggon was drawn on its belly *ſeldomer* than a low one. But now, when the roads are

"rendered

" rendered more paſſable, a more convenient " carriage ought to be adopted.

" If any leading man would introduce the " Glouceſterſhire waggon, he might be render- " ing his country an eſſential ſervice. The ſu- " periority of a waggon, which, when loaded " with a full harveſt-load, is not much higher " than the preſent waggon of this diſtrict when " empty, could not fail of being readily ſeen *."

Waggons are chiefly uſed in getting in the hay and corn harveſts, carrying the grain and hay to market, and bringing manure and coals from a diſtance. They are generally drawn by the whole team on the farm, where one only is kept, whatever number it may conſiſt of; and two men, or a man and a boy, are neceſſary to attend them.

In performing diſtant carriages, when the roads are level and ſubſtantially made, and the waggons at all times *fully loaded*, one of them may probably be as advantageouſly uſed as two or more carts of leſs dimenſions. But where the labour is required to be performed with expedition, as in hay and corn harveſts, theſe unweildy machines are certainly ill calculated for the purpoſe; and on every occaſion, when they return half or third part loaded, it is evident, the farmer ſuſtains a conſiderable loſs.

Inſtances

* Marſhall's Rural Oeconomy of the midland counties, vol. 1. page 136.

Inſtances have occurred to the obſervation of the writer, in more than one open field pariſh in England, where a waggon (with three or four perſons, and as many horſes) has been diſpatched to collect and carry home ſcattered parcels of hay from the ends of ridges, which, after perambulating a great extent of the pariſh, returned only partly loaded. Conſidering the very high rate of labour, and the ſhamefully extravagant manner in which, in hay or corn harveſt, labourers and farm-ſervants are maintained in that kingdom, it is ſurpriſing, that every farmer does not exert himſelf to deviſe means whereby he may perform his work with greater expedition, and at leſs expence.

The dung-carts uſed in the greateſt part of England differ ſo little, either in ſize or ſhape, from thoſe employed for all the purpoſes of carriage in the better cultivated parts of Scotland *, that a ſeparate deſcription is unneceſſary.

* In Cornwall in England, and Orkney, Caithneſs, and ſome other counties in the north of Scotland, there are comparatively few wheel-carriages uſed in the operations of huſbandry. The dung, grain, and other articles, being carried in ſacks or baſkets on horſes backs; and, except on the farms in the poſſeſſion of the proprietors, the few that are uſed, are in general mean and contemptible to the laſt degree.

The carts in Scotland are generally about five feet in length, and three feet ſix inches broad in the bottom. The height of the ſides from fifteen to ſixteen inches, riſing gradually towards the fore end, which is about ſeventeen inches. The wheels, which are for the moſt part made to move on iron-axles, are from four feet ſix inches to four feet ten inches high. The principal thing to be attended to in the conſtruction of a cart, is the properly adapting the wheels and axle, which ſhould be done in ſuch a manner, that the carriage may move with eaſe, and with the leaſt force.

There is another kind of carriage very generally uſed in Scotland during the hay and corn harveſts, called a corn-cart, and which, at theſe periods, is found to anſwer all the purpoſes of a waggon. It is made of bars of wood, conſiderably longer than the common cart, having rails projecting over the ſides on the top, and is well calculated for carrying a bulky load. This carriage, in order to ſave the expence of a double ſet of wheels, is made to ſuit the axle of the common cart, on which it is placed as occaſion requires. Where ſuch carriages are not in uſe, frames, or hay-tops as they are termed, are placed above the ordinary cart, which anſwer nearly the ſame purpoſe.

In every part of England where the writer has had occaſion to travel, the dung-carts are commonly

commonly drawn by three horſes. On the other hand, there is ſcarcely any inſtance in Scotland, where more than two horſes are employed in drawing any carriage uſed in huſbandry.

As the practice of uſing carts drawn by two horſes inſtead of waggons, has been hinted as being beneficial, it may be proper to ſtate the weight of ſuch articles as a farmer has occaſion moſt frequently to tranſport, and as are commonly drawn in a two horſe cart in Scotland.

Dung, from 15 to 20 cwt.

Lime-ſhells, 4½ bolls barley meaſure, equal to 27 or 28 Wincheſter buſhels of unſlacked lime.

Coals, 2½ bolls, each boll 56 ſtone, of 16 lb. Amſterdam, amounting to near 22 cwt.

Barley, 10 bolls, or upwards, of 7 qrs.

Hay, from 80 to 100 ſtone, of 22 lb. Amſterdam, ſay 90 ſtone, or about 17 cwt.

It is not poſſible to convey any correct idea of the weight or bulk of a load of corn and ſtraw; it may however be inferred, from what is mentioned reſpecting hay, and conſidering the additional weight of grain, it muſt be upwards of 20 cwt.

When a fair compariſon is made of theſe with the ordinary waggon-loads drawn in England, and the difference in the number of horſes is conſidered, it will be found, that two horſe carts are nearly as much preferable to waggons in point of œconomy, as two horſe ploughs to thoſe which

which are drawn by double the number. The ſaving which would reſult from uſing two horſe carts in place of waggons, is not however to be ſingly conſidered. While, in this reſpect, the advantage to the farmer appears evident, nothing would at the ſame time tend more effectually to aboliſh the abſurd and very expenſive practice of uſing four, five, or ſix horſes in a ſingle furrow plough, or be the means of ſo expeditiouſly introducing the more improved mode of ploughing with two horſes. It is well known, that the objection to two horſe ploughs, in many parts of England, is the diſlike which the waggoners expreſs at having their teams broken or ſeparated. Were two horſe carts commonly uſed, this objection would be removed, and the teams would be kept entire, every ploughman tending and working his own pair of horſes.

Thraſhing Mill.—The manner in which the farmers of old ſeparated the corn from the ſtraw, may be inferred from one of the laws promulgated by Moſes to the Iſraelites: "Thou ſhalt "not muzzle the ox when he treadeth out the "corn *." Treading out the corn by the hoofs of cattle, was alſo common among the Grecians, and is deſcribed by Pope in the two following lines.

"When round and round with never weary'd pain,
The trampling ſteers tread out the unnumber'd grain †.

The

* Deuteronomy, chap. xxv. ver. 4.

† Homer's Iliad, Book xx. ver. 495.

The Romans adopted the ſame practice, and alſo uſed a kind of thraſhing-machine, which Varro thus deſcribes: "The grain is beat "out of the ears in the *area*, (thraſhing-floor) "which ſome do by yoked cattle and a *Tribulum*; "this machine is made of a board, rough with "ſtones or iron, which, with a driver placed "upon it, or a great weight, is drawn by yoked "cattle, to beat the grain from the ears, or "it is made of a plank with little rollers in "place of teeth; this kind is called *Poleſtellum* "*Pœnicum*; in Hither Spain, and other places, "a man ſits upon this machine, and drives the "cattle that draw it."

That the Romans alſo uſed flails, is evident from the account given of the manner of beating out corn by Columella: "When the ears "only are reaped, they may be carried to the "barn, and afterwards, during the winter, beaten out with flails."

Whether the practice of beating out the corns by the hoofs of cattle, was ever introduced by the Romans into this iſland, the writer is uncertain. There is, however, ſome reaſon to believe it was; at leaſt, ſeveral of the modes adopted by that people in harveſting their crops, are common at this day in ſome parts of England. The *nubilarium* deſcribed by the ruſtic writers, as being placed adjoining to the *area* or thraſhing-floor, had a great ſimilarity to the large barns which

which are ſtill deemed requiſite for ſtowing the crops in many of the Engliſh counties. The method of reaping the wheat alſo, with only part of the ſtraw, and afterwards mowing the ſtubble, is general over a great part of that kingdom; and the practice of cleaning or winnowing grain, by throwing it with ſhovels from one part of the barn to another, which is ſo common in Norfolk, although peculiar to that county, is clearly borrowed from the Romans.

The univerſal practice of thraſhing or beating out the grain adopted in theſe kingdoms, till within theſe few years, was by manual labour, and a ſimple inſtrument, known by the name of the Flail. A machine, called a Thraſhing-Mill, has however been lately invented, or rather brought to its preſent ſtate of perfection, by Mr George Meikle, ſometime mill-wright at Alloa, in the county of Clackmannan in Scotland *. This machine was firſt introduced into general uſe in the Carſe of Gowrie, in Perthſhire, about the year 1787; and being juſtly reckoned an improvement

* The firſt thraſhing-mill the writer ever heard of, and probably the firſt that ever was conſtructed in Great Britain, was erected by Mr Thomas Keir, at his farm of Fintelach, on the eſtate of Perth, in Perthſhire, about twenty-five years ago. It is very different from thoſe now common, being made exactly on the principles of the mills uſed for breaking flax.

improvement of the greateſt conſequence to huſbandry, eſpecially when any conſiderable quantity of grain is cultivated, is not now confined to that particular diſtrict, but has become common in almoſt every county in the kingdom, and has alſo been partially introduced into England.

The farmer who is in poſſeſſion of one of theſe machines, need no longer be afraid of the difficulty of finding labourers to thraſh his grain, nor of imperfect or careleſs performance, as the work is done in a much more complete manner than can be effected in the ordinary way, and in ſo ſhort a ſpace, that he may be perſonally preſent, however much he may in general be engaged in other buſineſs.

Although experience has proved, that even the moſt correct drawing of a machine is not ſufficient at all times to guide workmen in another country in the conſtruction of others in every reſpect ſimilar, ſo much depending, eſpecially when it is complex, on attention to minute particulars; yet in hopes that an accurate drawing of a thraſhing-mill may tend at leaſt to excite a ſpirit of inquiry in thoſe who have not had an opportunity of ſeeing one, reſpecting the ſuperior advantages which it poſſeſſes over every other machine hitherto invented for the purpoſe, one is here annexed.

The following deſcription will, it is ſuppoſed be found ſo accurate, that any carpenter poſſeſſing an ordinary degree of mathematical knowledge, will be under little difficulty of either underſtanding the principles on which it operates, or of conſtructing one in every reſpect ſimilar.

Deſcription of the annexed Ground-plan and Elevation of a Thraſhing-mill, conſtructed to be worked by four horſes, and erected by Mr William Dick, millwright, Dundee, on the farm of Ballindean, the property of Sir John Wedderburn, Baronet, in the Carſe of Gowrie, in the County of Perth.

A A, the wall that ſeparates the ſhed or horſe-courſe from the barn.

B B B B B B B B, are pillars which ſupport the roof of the ſhed. C, is a large beam laid on the top of two of the pillars, which is made ſteady by two rafters C C, fixed on the wall of the barn. The large beam receives the upper pivot of the perpendicular axle of the great wheel, and the ſmall croſs beam *c* receives the pivot of the axle I, which will be afterwards explained.

D, is a frame of wood fixed to the ground or floor of the ſhed, which receives the lower pivot of the perpendicular axle E.

E,

E, is the perpendicular axle of the great wheel, to which the four levers F F F F are fixed, and whereby the horſes ſet the machine in motion, being yoked at the extremities *e e*.

G, is the large cog-wheel, 16 feet in diameter, which contains 180 cogs. This wheel is placed above the levers, and near the top of the perpendicular axle E. It turns a pinion H, 17¼ inches diameter, having 15 cogs or teeth. This pinion is turned by the horizontal axle I, which reaches from the large cog-wheel through the wall into the barn.

On this axle I is alſo fixed a ſpur-wheel K, 4 feet 6 inches diameter, with 86 cogs. This ſpur-wheel turns the pinion L on M the axle of the cylinder, or thraſhing-drum.

On the ſame horizontal axle I are placed N, three band-wheels *; theſe are connected with other three band-wheels O †, on the end of the feeding rollers P, by means of a ſtrong leather ſtrap, about two inches and a quarter broad, which, when tightened, puts the feeding rollers in motion, and by placing the leather ſtrap or band on the one or other of theſe wheels N and

* The largeſt 24 inches, the next 21 inches, and the ſmalleſt 18 inches diameter.

† The firſt 18 inches, the ſecond 14 inches, and the third 10 inches diameter.

O, the velocity of the feeding rollers is increaſed or decreaſed to the extent afterwards explained.

On the axle I, is alſo placed another band-wheel *q*, which is 28 inches in diameter; this turns R, the axle of the rake, by another band-wheel S, of 20 inches diameter; theſe are alſo ſet in motion by a leather ſtrap fixed round them.

On the thraſhing-drum axle M, is fixed U, a band-wheel 14 inches diameter, which ſets the fanners in motion, by a rope running from U to the axle of the fanners, where is placed a band-wheel of the ſame ſize as that on M, the axle of the thraſhing-drum.

W, is a ſloping board or table, where the unthraſhed corn is ſpread, and conducted into the feeding rollers P, through which it paſſes to the thraſhing-drum V. Theſe rollers being fluted, the corn paſſes regularly through them, and is ſcutched by the four thraſhers X X X X, which are fixed on the cylinder or drum V. Theſe thraſhers, as they project about three inches from the covering of the cylinder, and are conſtantly moving upwards with great velocity when the mill is at work, ſeparate the grain very completely from the ſtraw.

Y, is a cover on the top of the cylinder or thraſhing-drum, which moves up or down, according to the quantity of ſtraw paſſing through the mill at the time, and by means of which the ſtraw is kept longer ſubjected to the ſtrokes of the ſcutchers.

When

When the unthraſhed corn paſſes through the feeding rollers P, it is thrown by the drum, after being ſcutched or thraſhed, on a circular grate *f*, whence the ſtraw is carried off by the rakes RRRRRR, and thrown down over a ſloping grating g; and while the ſtraw is thus taken off the circular grate *f* *, the grain and chaff go through that grate, and are guided by a large hopper *b* into *i* the fanners. In paſſing through the fanners, the grain and chaff are completely ſeparated from each other, the grain coming out at *k*, while the chaff and other refuſe are carried back to *l*, a place behind the fanners, and which is entirely unconnected with any other part of the barn.

A thraſhing-mill conſtructed on the principles above deſcribed, ſuppoſing the diameter of the ſhed or horſe-courſe to be 24 feet, and that the horſes walk three times round in the minute, which is nearly at the rate of two miles and a half in the hour; the cylinder or thraſhing-drum, which is three feet in diameter, would make 289½ revolutions in the minute. The four thraſhers would

* The kind of rake above deſcribed is a late invention; but which being found to anſwer in practice, may be conſidered a great improvement. Formerly, the ſtraw was thrown out from the ſcutchers on the upper floor of the barn, and required a conſiderable degree of manual labour in ſhaking, which, by this new invention, is in a great meaſure ſaved.

By the above account, in which the hire of the men and horſes are charged at the higheſt rate, the expence of thraſhing 45 quarters of grain would coſt L. 1 : 7 : 6, or about 7 d. each quarter. Over Great Britain at large, thraſhing 45 quarters of grain with the flail, including an equal proportion of all kinds, cannot be eſtimated at leſs than L. 3 : 7 : 6, or 1 s. 6 d. each quarter, making a difference of about 11 d. each quarter. It may alſo be obſerved, that ſince the introduction of theſe mills, the grain is thraſhed by the ordinary ſervants on the farm, and without, in any material degree, obſtructing the operations in the field, the farmers in general employing their men and horſes in this way, in bad weather, when no other buſineſs can be undertaken.

The whole expence of a thraſhing-mill, including the building of the ſhed for covering the great wheel, does not, in almoſt any caſe, exceed L. 100. The ordinary annual repairs may, one year with another, amount to L. 5, which added to the intereſt of the prime coſt, makes the yearly expence L. 10; a ſum for which any quantity of grain, however great, that may be ſuppoſed to grow on one farm, can be thraſhed, and that too in a manner much ſuperior to what can be done by manual labour. The expence either of erecting theſe machines, or of keeping them afterwards in repair, muſt be conſidered by every intelligent occupier of a corn-farm, as a ſecondary object, when compared with

with the advantages that are derived from them, namely, the performing of the operation at leſs than half the ordinary price, and affording the farmer the means of ſecuring his grain from embezzlement, to which may be added, on the teſtimony of many of the moſt reſpectable farmers in Scotland, that the ſaving, in regard to ſuperior clean thraſhing, is not only more than the annual expence of repairs, but ſo great as, on a farm of conſiderable extent, to reimburſe the farmer for his whole expenditure in the courſe of a few years.

Conſidering the increaſing ſcarcity of labourers, and the recent great advance in the rate of labour in all the better cultivated parts of theſe kingdoms, the introduction of thraſhing-mills into common uſe, cannot fail to be highly beneficial. Some objections the writer has heard urged againſt them by Engliſh farmers, as that if they were erected on every farm, the labouring claſs of people would be deprived of employment, and the poor rates of courſe would advance. Experience is in every caſe the ſureſt guide. When thraſhing-mills were firſt introduced into the Carſe of Gowrie, the farm-ſervants and labourers looked upon them with a jealous eye; but a ſhort time reconciled the former to the uſe of them, nor do the latter ſeem to feel their ſituation in any degree impaired. Were they generally introduced into England, the labouring people would ſoon find other employment,

ployment, by which they could provide for their families, without becoming a burden on the public. And as every invention that leſſens the expence of managing a farm puts it in the farmer's power to diſpoſe of the produce on more reaſonable terms, their ſituation would in ſo far be improved.

There is, however, one bar againſt the introduction of thraſhing-mills into the ſouthern parts of England, which, owing to the manner of harveſting all kinds of grain, except wheat, may not be eaſily removed. It will be obſerved from the preceding deſcription, that the corn, in order to be clean thraſhed, ſhould be put into the machine as ſtraight and regular as poſſible. For while the ſheaves, after being looſed and ſpread on the board, ſo as to be eaſily taken in by the feeding rollers, are paſſing between them, they keep the ſtraw ſteady, by which means the ſtrokes of the thraſhers or ſcutchers operate with more force and effect in ſeparating the grain from the ears; whereas, if the unthraſhed corn goes in ſideways or irregularly, the thraſhers can have little or no power. This would no doubt frequently happen in thraſhing corns mowed with the ſcythe, and which are afterwards harveſted in every reſpect like hay, ſo that unleſs the unthraſhed grain is put into the mill in ſmall quantities, it is next to impoſſible that it ſhould be completely ſeparated from the ſtraw.

Fan,

Fan, or Fanner.—Wind is eſſentially neceſſary in cleaning grain, or ſeeds of any kind. The huſks or chaff being lighter than the ſeeds which they incloſed, are by the force of wind carried to a greater diſtance, and thereby a complete ſeparation takes place. The natural action of the winds being ſo extremely inconſtant, no doubt induced the ancients to conſtruct inſtruments by which the operation of cleaning grain was rendered leſs difficult and precarious. What theſe inſtruments were, except the ſhovel for throwing grain from one part of the barn or thraſhing-floor to another, is now uncertain, probably, however, the ſail-fan, ſo commonly uſed in England, was among the number.

It was not till little more than thirty years ago, that any other means was thought of in Scotland for ſeparating grain from the chaff, than the action of the natural wind operating between the two doors of the barn. There a perſon ſtood for the purpoſe of dropping the grain from a kind of ſieve, and in quantities proportioned to the force of the wind at the time. About the period above mentioned, the fan or fanner was introduced from Holland, where that kind of machine had been for a conſiderable time in common uſe *. Fanners, pro-

* Fanners were firſt brought to Holland from the Eaſt Indies, where they have been long uſed in cleaning rice.

perly ſo called, are now general in Scotland, and are alſo partially uſed in England.

The fan, which is the acting part of the machine, is capable of being turned round on its axis, with a greater or leſs degree of velocity, according to the force of wind neceſſary to anſwer the intended purpoſe. One man works the machine eaſily by means of a handle; another is employed in filling the hopper, and a third in riddling and laying aſide the grain, if not meaſured up at the time; when that is the caſe, more hands are neceſſary.

Since thraſhing-mills have been introduced, the fanners are generally made by them, in place of being ſet in motion by manual labour. By which means the unthraſhed grain, after entering between the feeders of the thraſhing-mill, becomes inviſible, till it again appears in three diviſions, each entirely ſeparate from the other. The grain being forced to one place; the chaff to another; and the ſtraw to a third; a degree of perfection in regard to barn-management unknown in any other age or country.

Such are the principal implements of huſbandry uſed at the cloſe of the eighteenth century in Great Britain. They are not only much improved beyond what were common in any former period, but thoſe of ſuperior conſtruction are alſo more generally introduced over the iſland at large. It muſt, however, be remarked that the preceding deſcription does not apply to the

the implements of huſbandry uſed in every part of theſe kingdoms. There are diſtricts, and theſe both large and numerous, where the implements in common uſe are of the old faſhioned ſort, and ſuch as are by no means calculated for the due cultivation of the ſoil, or for carrying on the ordinary operations of huſbandry to advantage. Witneſs the highlands and iſlands of Scotland, ſeveral counties in Wales, and ſome few on the weſt coaſt of England. Can the proprietors of theſe diſtricts have forgot the celebrated ſpeech of C. Furius Creſinus. This expert farmer, when cited before an aſſembly of the Roman people, to anſwer a charge of ſorcery, on account of his reaping greater crops from a ſmall ſpot, than his neighbours did from extenſive farms, produced his ſtrong well conſtructed implements of huſbandry, his well fed oxen, and a ſtout young woman his daughter, and pointing to them, addreſſed the aſſembly to this effect; "Theſe Romans are my inſtruments of "witchcraft *."

Every perſon acquainted with cultivation, will agree with this memorable huſbandman, that well conſtructed implements, and cattle of ſufficient ſtrength to perform the various operations, aided by attention and induſtry, on the part of the farmer and his ſervants, will produce the effects here aſcribed to ſorcery; and they muſt alſo be ſatisfied, that without the former, the latter are of little avail. The

* Plin. Nat. Hiſt. B. 18. c. 6.

The proprietors alluded are to in general well known ſtill to retain a great command over the minds of their tenants, and of courſe the taſk of introducing ſuch *inſtruments of witchcraft* as were on the above remarkable occaſion exhibited to the Romans, may be more eaſily performed. It is an unqueſtionable fact, that more is owing to the extreme negligence of theſe proprietors, than to any fault in their tenants, that improved implements of huſbandry are not now univerſally uſed in every part of the iſland. It may well be called extreme negligence. For, if theſe gentlemen will take the trouble to examine, they will find a C. Furius Creſinus on every eſtate. Men who, by uſing better implements of huſbandry, and cultivating their fields with cattle of ſuperior ſtrength, reap greater crops than their neighbours; and who, were they called before the Britiſh Senate, as this induſtrious man was before the "Curule Edile," would give ſimilar anſwers. Were theſe proprietors anxious to promote their own, or the national intereſt, they would reward the laudable exertions of individuals. This would create ſuch a ſpirit of emulation in others, as would ſoon produce the deſired effects. Till this line of conduct is more generally adopted, little improvements in the implements of huſbandry, or the modes of cultivation in theſe diſtricts, can be expected to take place.

CHAP-

CHAPTER IX.

Farm-ſervants, their Wages, and the different Modes in which they are maintained.

IN all civilized ſtates, the great body of the people live by labour; and whether it is of an agricultural, commercial, or manufacturing nature, the wages received muſt be more than ſufficient to maintain the labourer. Were it otherwiſe, he could not bring up his family; and conſequently, this claſs of men would ſoon become extinct.

In every country or diſtrict, where the uſeful arts are in a flouriſhing ſtate, and where thoſe employed in carrying them on, are moſt ſucceſsful in accumulating riches, the rate of wages, or price of labour, is higheſt. Luxury is a never failing attendant on riches, and the number of ſervants always increaſes with the means of maintaining them. Therefore, an increaſing demand for ſervants, or labourers, whether for carrying on agriculture, commerce, or manufactures,

tures, or for adminiſtering to the artificial wants created by luxury, naturally tends to advance the price of labour.

The very great recent advance in the rate of wages in ſome counties in Scotland, as Lanark, Renfrew, Perth, Angus, Fife, &c. amounts to the moſt poſitive evidence, that commerce, manufactures and improvements in agriculture, have rapidly increaſed. The ſtill low price of labour in the counties of Caermarthen, Pembroke, Cardigan, &c. in Wales; and Nairn, Inverneſs, and the other northern counties of Scotland, notwithſtanding the great emigrations of labourers to thoſe parts of the iſland, where they are more certain of finding employment, is a ſure ſign that in theſe remote diſtricts, the arts have ſcarcely ever been introduced. It ſhews alſo, that little attention is beſtowed by the proprietors to improve the ſituation of the peaſantry, either by inuring them to habits of induſtry, or inſtructing them in the advantages to be derived from a proper diviſion of labour. In thoſe counties, where the arts have been introduced, and where the rate of labour has continued for a number of years nearly the ſame, it will be found that agriculture, commerce, and manufactures, although perhaps formerly in a proſperous ſtate, are at preſent ſtationary, and that a national exertion is neceſſary, in order to ſet them again in motion.

The

The wages of farm-ſervants, and of labourers, who are occaſionally engaged in the operations of huſbandry, vary nearly as much in the different diſtricts of Great Britain, as they do in the ſeveral kingdoms of Europe. In the counties in England, where commerce and manufactures are carried on to the greateſt extent; as Middleſex, Surry, Kent, Lancaſter, Cheſter, the Weſt Riding of Yorkſhire, &c. the wages of farm-ſervants and day-labourers may be ſtated as follows:

			Average.
A ploughman by the year, from L. 9 to L. 15,			L. 12 0 0
A female ſervant ditto, from L. 4 to L. 6,			5 0 0
A labourer in ſummer, from		1 s. 6 d. to 2 s.	0 1 9
A labourer in winter,		1 s. to 1 s. 2 d.	0 1 1
A maſon,	witht. board from	1 s. 10 d. to 2 s. 2 d.	0 2 0
A carpenter,		1 s. 8 d. to 2 s. 4 d.	0 2 0

Where agriculture is the chief employment of the people, as in Hertford, Buckingham, Rutland, Northampton, Worceſter, Northumberland, &c.

			Average.
A ploughman's wages may be ſtated from L. 7 to L. 12,			L. 9 10 0
A female ſervant, from L. 3, 10 s. to L. 5,			4 5 0
A labourer in ſummer,		1 s. 4 d. to 1 s. 8 d.	0 1 6
Ditto in winter,		1 s. to 1 s. 2 d.	0 1 1
A maſon,	witht. board from	2 s. 2 d. to 2 s. 4 d.	0 2 0
A carpenter,		1 s. 8 d. to 2 s. 4 d.	0 2 0

In thoſe counties in Wales, where improved modes of huſbandry are little practiſed, and where

where there are ſcarcely any commerce or manufactures,

			Average.
A ploughman's wages is from L. 4, 10 s. to L. 7,			L. 5 15 0
A female ſervant, from L. 2, 10s. to L. 4, 4s.			3 7 0
A day-labourer in ſummer,	witht. board from	8d. to 1 s.	0 0 10
Ditto in winter,	witht. board from	6d. to 8d.	0 0 7
A maſon,	witht. board from	1 s. 6d. to 2 s.	0 1 9
A carpenter,	witht. board from	1 s. 4d. to 1s. 8d.	0 1 6

It has been obſerved, that the rate of wages has advanced very rapidly of late years in many counties in Scotland. In that part of the kingdom, ſouth of the Grampian mountains, the riſe in the price of labour has been general, and is now nearly double what it was 20 years ago.

			Average.
A ploughman's wages is from L. 7, to L. 12,			L. 9 10 0
A female ſervant, from L. 3, to L. 4, 10 s.			3 15 0
A day-labourer in ſummer,	witht. board from	1 s. 2 d. to 1 s. 6 d.	0 1 4
Ditto in winter,	witht. board from	10 d. to 1 s. 2 d.	0 1 0
A maſon,	witht. board from	1 s. 6 d. to 2 s. 4 d.	0 1 11
A carpenter,	witht. board from	1 s. 4 d. to 2 s.	0 1 8

In the northern diviſion of the kingdom, where there is little commerce or manufactures, and where improvements in agriculture are only partially introduced,

			Average.
A ploughman receives from L. 3, to L. 6,			L. 4 10 0
A female ſervant, from L. 2, 2 s. to L. 3, 14 s.			2 18 0
A day-labourer in ſummer,	witht. board from	8 d. to 1 s.	0 0 10
Ditto in winter,	witht. board from	6 d. to 8 d.	0 0 7
A maſon,	witht. board from	1 s. to 1 s. 6 d.	0 1 5
A carpenter,	witht. board from	1 s. to 1 s. 4 d.	0 1 2

From

From the above averages, the following table which may be conſidered to contain pretty nearly the medium rate of agricultural labour in theſe kingdoms, at the preſent period, is formed:

			General Average.
A ploughman,			L. 7 3 6
A female ſervant,			3 7 0
A day-labour in ſummer,	without board,		0 1 3
Ditto in winter,			0 0 11
A maſon,			0 1 10
A carpenter,			0 1 8

In the above ſtatements, the difference in the rate of wages does not appear ſo conſiderable, (except in Wales, and the north of Scotland, compared with the better cultivated parts of Great Britain), as had it been poſſible to aſcertain the price of labour in each particular county: Local circumſtances frequently operating to augment or depreſs the rate of wages in particular diſtricts, which is not diſcernible when numbers are claſſed together.

The price of labour, or rate of wages, is affected by ſome, or all, of the following cauſes, *viz.*

I. The increaſe of commerce and manufactures.

II. The depreciation in the value of money, and its preſent nominal value, compared with the price of the ordinary articles of proviſions.

III. The general introduction of improvements, and of new modes of cultivation; whereby, although fewer hands are neceſſary, thoſe poſſeſſing ſuperior ſkill become more in requeſt.

IV. The eaſe or difficulty of finding conſtant and regular employment.

V. The mode in which a farm-ſervant, or labourer, maintains his family.

SEC-

SECTION I.

The Increaſe of Commerce and Manufactures.

THAT the increaſe of the commerce and manufactures of the towns, has contributed to the improvement of the country, as well by affording a ready market for the produce of the ſoil, as by various other means, will not be denied; but that the rapid increaſe of them within theſe few years, has had a great effect in raiſing the price of labour, is equally evident.

The great numbers of people crouded together in large cities and manufacturing towns, are not only againſt the increaſe of population, but alſo againſt longevity. There are beſides ſeveral ſorts of manufactures, which are well known to be deſtructive of the human conſtitution; not to mention the many accidents to which thoſe employed in the various branches of commerce and manufactures are expoſed, tending to ſhorten life, and from which theſe engaged in the operations of huſbandry are exempted. For theſe reaſons, there is a conſtant demand for people from the country, in order to keep up the population, and to carry on the commerce and manufactures of the towns.

The great additional price commonly paid for commercial and manufacturing, beyond that for agricultural

agricultural labour, (except where the influence of the former affects the latter), and the habits of luxury, in which the labouring part of the community live in towns, compared with the generality of their neighbours of the ſame claſs in the country, (particularly in Scotland), are ſtrong inducements with many of the peaſantry, either to remove to the towns, or to ſend their children thither: While others, in conſequence of the too general practice, of adding farm to farm, and demoliſhing cottages, are forced to ſeek that aſylum in towns, which is refuſed them in the country.

The demand for labourers from the towns being complied with, the country is thereby drained of uſeful hands, and the price of agricultural labour advanced. This muſt neceſſarily happen in every kingdom during the period that its commerce and manufactures are on the increaſe, and more eſpecially in thoſe nations where the Legiſlature turns its attention to ſupport commerce and manufactures, at the expence of agriculture.

SEC-

SECTION II.

The Depreciation in the Value of Money, and its preſent Nominal Value, compared with the Price of the ordinary Articles of Proviſions.

THE depreciation in the value of money is alſo another and a ſubſtantial reaſon, for the apparent riſe in the price of labour. It would be foreign from the preſent purpoſe to enter into a diſcuſſion of the origin of money; or to give an account of thoſe articles which previous to the introduction of the uſe of precious metals, were adopted in the different nations of Europe as mediums by which traffic was carried on. The increaſe of commerce and manufactures, which has been gradually taking place in this iſland ever ſince the beginning of the reign of Queen Elizabeth, and the immenſe additions which have been, almoſt every year, making to the national debt within the preſent century, ſeem to have rendered it neceſſary, to increaſe, nominally, by means of bank-notes, promiſſory notes, bills, &c. the quantity of money in circulation. That theſe ſubſtitutes for ſpecie have had the effect to reduce the value of money, is an obvious fact; and indeed it would appear

appear from the late reſolutions of the Directors of the Bank of England, in regard to diſcounting bills, that they are alarmed at the extent of paper in circulation, beyond the quantity of ſpecie, which could be produced to retire it, in caſe of any ſudden demand.

If, therefore, the value of money has fallen, the labourer of the preſent day requires of courſe a greater quantity to carry to market than his predeceſſors, to purchaſe even ſuch articles as are conſidered in the particular diſtrict where he reſides (whether right or wrong) as indiſpenſably neceſſary for the maintenance of a peaſant's family. Whether the Middleſex labourer goes to market to purchaſe beef or mutton; or the Aberdeenſhire cottager, oat-meal; it will be found, that nearly double the ſum is required to purchaſe the ſame quantity now that it did thirty years ago.

As the price of grain has fluctuated leſs during that period than any other article of proviſions, it may be proper to obſerve, as a proof of the depreciation in the value of money, that little more than thirty years ago, it was the practice in ſome parts of Scotland, (in the county of Moray in particular), for the farmers to pay their labourers with oat-meal. A peck was the ordinary price of a day's labour; and at that period, the medium price of oat-meal was from ſeven pence to eight pence the peck. Till within theſe few

few months, when, from the alarming ſcarcity which prevails, grain of all kinds has advanced to an extraordinary price, oat-meal has been ſold for a ſeries of years from ten pence to one ſhilling and three pence the peck. Agricultural labour by the day may be eſtimated at nearly the ſame rate; ſo that although a very great alteration has no doubt taken place in the money-price of labour, yet the real price or value, which conſiſts in bartering or exchanging labour for proviſions, may be ſaid to continue in the county of Moray on much the ſame footing for the whole period above mentioned. And it may be fairly inferred, that if the writer had been as long and as well acquainted with the rural œconomy of other diſtricts as with that of Moray, he would have had no difficulty in eſtabliſhing many other facts of a ſimilar nature, in order to ſatisfy the reader, that however much the nominal price of labour has increaſed, its real price, compared with that quantity of proviſions which it will purchaſe, remains all over the iſland nearly the ſame, except only where a variety of circumſtances combine to raiſe or depreſs it beyond its ordinary level.

The price of labour is raiſed beyond its ordinary *par* in the vicinity of all large cities and towns, in conſequence of the great and conſtant demand for commercial and manufacturing labourers,

bourers. The great number of people conſtantly employed in ſome of the mining diſtricts, as Cornwall, Angleſey, Durham, &c. tends alſo to augment the rate of all kinds of labour, not only in theſe, but frequently in the adjoining counties. The very extenſive public works carried on in ſome parts of theſe kingdoms, ſuch as canals in Northampton, Leiceſter, and ſome of the other midland counties in England, and the turnpike-roads in the ſouth and weſt of Scotland, by creating a ſcarcity of hands for performing ordinary labour, of courſe enhance the price.

The price of labour is depreſſed, or kept under its proper medium, only in the more remote parts of Great Britain, and happens chiefly from one cauſe, namely, the want of attention in the proprietors to procure full employment for the inhabitants. In ſeveral of the counties of Wales, and in thoſe of the north of Scotland, there are ſcarcely commerce, manufactures, or public works of any kind carried on; and owing to the wretched ſyſtem of huſbandry ſtill practiſed, which requires little labour compared to what is beſtowed where improvements have been introduced, or become general, the inhabitants are in a great meaſure without employment. The population as in China is too great for the means of its ſubſiſtence; and were not theſe diſtricts frequently drained of hands to ſupply the armies

of

of the State, all the authority with which the Legiſlature is inveſted, could not prevent them from emigrating to America, or ſome other part of the world, where the price of their labour would furniſh them with an ample ſupply of all the neceſſaries, and even ſome of the comforts of life.

SECTION III.

The General Introduction of Improvements, and of New Modes of Cultivation, whereby, although fewer hands are neceſſary, thoſe poſſeſſing ſuperior ſkill become more in requeſt.

Besides forming canals and turnpike-roads, which may be conſidered equally beneficial to the intereſts of commerce and manufactures, as to thoſe of agriculture, there have been many improvements introduced in huſbandry, which, while they have contributed to advance alike the proſperity of the nation, of the proprietors and farmers, have alſo been the means of bringing about a conſiderable alteration in the ſituation of the inhabitants at large, as well as in the price of labour. The immenſe numbers of people neceſ-

ſary for carrying on the various operations of incloſing, draining, planting, erecting farm-buildings, digging marl, quarrying and burning limeſtone, hoeing potatoes, turnips, and other green crops, muſt firſt have had the effect of giving full employment to the people in thoſe diſtricts where ſuch improvements were introduced, and gradually to advance the rate of wages, in conſequence of the increaſed demand for labourers.

The general introduction of new modes of cultivation, whereby, although fewer people are neceſſary, thoſe poſſeſſing ſuperior ſkill become more in requeſt, is another reaſon of the advance in the wages of farm-ſervants. This obſervation will be conſidered as well founded by all thoſe who recollect the period, when ploughing with a man and two horſes, without a driver, became common in Scotland. The number of horſes or oxen, formerly worked in the plough, varied in ſome caſes, according to the nature of the ſoil; but was more frequently regulated either by the cuſtom of the diſtrict, or the fancy of the farmer. When, in conſequence of the ſpirited exertions of ſome individuals in ſeveral counties, the practice of ploughing with two horſes was pretty generally introduced, the farmers found themſelves thereby relieved of a very great ſhare of the annual expence of cultivation;

tion; but as it was then conſidered a very arduous undertaking to manage a two-horſe plough, every farmer ſelected the beſt ploughmen he could find; and theſe becoming thereby in requeſt, it was no difficult matter for them to bargain for an augmentation of wages, which the farmers of that period could very well afford, and which many, now living, will not heſitate to acknowledge they granted on principles of œconomy.

SECTION IV.

The Eaſe or Difficulty of finding regular and conſtant Employment.

The eaſe or difficulty which labourers frequently have in finding conſtant and regular employment; or, in other words, when labourers are only partially employed, the rate of wages muſt be affected by that circumſtance.

It has already been obſerved, that thoſe who live by labour, muſt receive ſuch a compenſation as is *more* than ſufficient for their ſubſiſtence. When a labourer has conſtant employment, whatever

whatever be the rate of wages, as it muſt be equal to the price of the ordinary articles of proviſions, in whatever part of the iſland he is ſituated, his incomings and outgivings will be nearly the ſame. Hence it follows, that when from the difficulty of finding employment, he can only procure work for three, four, or five days in the week, he muſt receive the ſame ſum for theſe three, four, or five days, that in the other caſe he would do for the labour of ſix; otherwiſe his incomings muſt be leſs than he is neceſſarily called to expend. When that happens, labourers are often obliged to remove occaſionally to another quater, or betake themſelves to ſome mechanical employment; and in either caſe, their ſervices are loſt to the farming part of the community where they reſide. The want of conſtant employment, therefore, operates in two ways to raiſe the price of labour; firſt, by the neceſſity the labourer is under while he continues in that capacity of demanding as much for the work of three, four, or five days, as is fully equal to his ſubſiſtence for a week; and, ſecondly, many of them being obliged to betake themſelves to other means of providing for themſelves and families, the number of labourers becomes greatly diminiſhed, and the remainder, of courſe, more in requeſt.

This evil is, however, ſeldom complained of, except in thoſe diſtricts where improvements

have been partially introduced, but not generally adopted. Labourers, like adventurers of every other deſcription, crowd to thoſe places where they are informed they can diſpoſe of their time and talents to better advantage, than they can do in their own country. If they are ſucceſsful, they ſoon gain a comfortable ſettlement. If by any means the enterpriſe fails, they are ſoon placed in one or other of the ſituations above deſcribed, and the ſame conſequences to themſelves and to the community neceſſarily enſue. The occaſional removal of labourers in queſt of work, (from a diſtrict where no improvements have taken place, to others, where, from a multiplicity of public and private works going forward, there is a ſcarcity of labourers), has by no means the ſame effect on the price of labour in the county whence they removed. It is common for many of the inhabitants of the northern parts of Scotland, to travel ſouthward every ſpring and ſummer in queſt of labour, with the wages of which they return in autumn, where, like the ſwallows, they ſleep out a long and tedious winter, without ever rouſing from that ſtate of apathy, ſo natural to a northern highlander in his native country. On the return of the following ſpring, they again emigrate to a warmer climate, their own country not being in the leaſt degree affected, in regard to the price of labour, either by their preſence or their abſence.

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SECTION V.

The Mode in which a Farm-ſervant or Labourer maintains his Family.

THE various modes in which farm-ſervants and labourers maintain their families, muſt neceſſarily have a very great influence on the expence of agricultural labour in different parts of this iſland.

In a great part of England, butcher-meat, dumplings or puddings, bread made of fine flour, with beer, ale, and very commonly tea, are reckoned indiſpenſable articles of cottage houſekeeping. While in Scotland, oat-meal, cooked in various ways, vegetables, and now and then a little butcher-meat, are the chief articles which conſtitute the food of the people employed in huſbandry, even in the beſt cultivated parts of the kingdom.

This eſſential difference in the mode of living muſt be a great additional expence in the article of labour to the Engliſh farmer, beyond what thoſe in Scotland are ſubjected to, and might induce ſuch as are not acquainted with the various circumſtances connected with the huſband-

ry

ry of both kingdoms, to give a decided preference in favour of Scotland. It ſhould, however, be remembered, that this kind of additional tax paid by the Engliſh farmer, more properly affects the landlord, and is one of the principal reaſons why lands in England are rented lower than thoſe of the ſame quality in Scotland. It being an indiſputable fact, and which, in Scotland, daily experience proves well founded, that a great proportion of what the farmers ſave in the article of labour, or by the introduction of more improved and leſs expenſive modes of cultivation, ſooner or later, finds its way into the landlord's pocket.

A very reſpectable author obſerves, that "the "difference in the mode of labourers ſubſiſtence "is not the cauſe, but the effect, of the differ- "ence in their wages; although," ſays he, "by "a ſtrange miſapprehenſion, I have frequently "heard it repreſented as the cauſe." And he adds, "It is not becauſe one man keeps a coach, "while his neighbour walks a-foot, that the one "is rich, and the other poor; but becauſe the "one is rich, he keeps a coach, and becauſe the "other is poor, he walks a-foot *."

It will be admitted, that at the period when a general alteration has taken place for the better in the

* Dr Smith's Nature and Cauſes of the Wealth of Nations, vol. i. p. 92.

the eſtabliſhed mode in which labourers maintain their families, (as in the ſouth of Scotland, where the price of labour has nearly doubled within theſe twenty years,) the expence at which a cottager's family is maintained, has advanced in the ſame proportion. They eat better food, wear more expenſive cloaths, and live in more comfortable dwellings,—all which, no doubt, as Dr Smith obſerves, is the effect, not the cauſe, of the recent increaſe in the price of labour.

In England, where the mode of maintaining a labourer's family has undergone little alteration for ages, it is preſumed, that although the difference in the modes of living was, at firſt, the effect naturally to be expected from a riſe in the price of labour; yet it is now one cauſe why the rate of wages continues in that kingdom to advance. Thoſe articles which, with that claſs were once deemed the luxuries, are now conſidered only as the bare neceſſaries of life, and the prices have advanced in nearly the ſame proportion as their wages. For inſtance, thoſe who in that country require labourers, muſt either pay them ſuch an advance of wages, as will enable them to ſubſiſt according to the general mode eſtabliſhed in the country, whatever the additional price of the ordinary articles of proviſions may be, or compel them to make uſe of the more ſimple and leſs expenſive kinds of food, which were uſed by that claſs of men a century

century or two ago. As every perſon who ſtands in need of labourers will adopt the firſt of theſe alternatives, it follows of courſe, that the difference which has long taken place in the mode of maintaining a labourer's family in England, compared to that of ancient times, is now one cauſe for the advance in the rate of wages.

The reaſon why no alteration has taken place in the ſituation of the peaſantry in Wales, and in the north of Scotland, has been already taken notice of. In theſe diſtricts, the rate of labour continues extremely low, and the miſerable manner in which the great body of the inhabitants live, is the effect naturally to be expected from that cauſe.

It has now become a general complaint among proprietors, merchants, manufacturers and farmers, that the price of labour has become too high. That owing to one or all of the cauſes before mentioned, it has advanced in many diſtricts to a degree unknown in any former period of the hiſtory of theſe kingdoms, is a fact well known. Thoſe who regret that the price of labour is advanced, (provided it is kept within proper bounds, and does not ariſe from a national neglect of the ſituation of the peaſantry), ought to comfort themſelves with the reflection, that this never happens in any State which is not increaſing in wealth and proſperity. It is owing to that cauſe, and to no other, that the

working people in any nation are more liberally rewarded for their labour; and in place of regret, it ought to give pleaſure to every friend to his country, that the great body of the community are enabled, from the fruits of their honeſt labours, to procure themſelves a greater ſhare of the comforts of life.

At the ſame time, let it be obſerved, that while thoſe who have occaſion to employ labourers, ought to pay attention to the advice of the author of the Seaſons:

> "Be mindful of the rough laborious hand
> "That ſinks you ſoft in elegance and eaſe,"

they ſhould alſo conſider, that there are bounds beyond which they ought not, in prudence, to paſs.

The mode of maintaining farm-ſervants in many parts of England, is both abſurd and expenſive in the extreme, and calls as loudly for reform as any error in the whole range of Britiſh huſbandry *.

It

* In Northamptonſhire, the breakfaſt conſiſts of cold meat, with cheeſe, bread and beer. For dinner, roaſt or boiled meat, with pudding; and for ſupper, the ſame as at breakfaſt; and beſides ale, which is allowed on extraordinary occaſions, they have ſmall beer at command at all hours—See the Editor's Report of Northamptonſhire to the Board of Agriculture.

Mr

It is obvious, that the extravagant manner in which the labouring people in many of the Engliſh counties live, in the early part of life, cannot increaſe their bodily ſtrength, nor improve their morals, while it tends to increaſe the number of poor, and of courſe to augment the poor rates. No perſon in the leaſt degree acquainted with human nature, can be ignorant, that early habits make the deepeſt impreſſion; and that a perſon in any rank of life, who has lived for a number of years in the midſt of plenty and luxury, will not be induced, but from neceſſity, to forſake that mode of living to which he has been accuſtomed, even although his means of ſupporting it be conſiderably diminiſhed. A farm-ſervant, when he gets married, and has a family, generally lives in the ſame expenſive manner which he did in the houſe of his maſter, ſo long at leaſt as he enjoys health, and is able to work; but when diſeaſe, or old age, overtakes him, having reſerved no fund for ſupporting himſelf

Mr Marſhall, in his Rural Oeconomy of the Midland Counties, after obſerving, that the beer and ale are brewed unreaſonably ſtrong, and that the quantity allowed to a man is unneceſſarily great, ſtates, That in hay and corn harveſt, the cuſtomary allowance is a gallon, (upwards of five bottles), of beer a man *per* day; and that during winter, the quantity of ſmall beer uſed, is not much leſs than in harveſt! What an aſtoniſhing conſumption, or rather waſte, of malt muſt here take place!

himſelf and family, he is under the neceſſity of applying to his pariſh for relief. Were a full and fair enquiry made in to the cauſes of the alarming increaſe of the number of poor in that kingdom, it would be found, that the one now mentioned had no inconſiderable effect.

The increaſed expence in the mode of maintaining farm-ſervants, as now too generally practiſed in England, is attributed to the following cauſes. Some few farmers in every county, either from a miſtaken idea, that the better their ſervants are fed, the more work they will perform, or from pride, and from a deſire to gain popularity among that claſs of people, lead the way; while their more ſenſible neighbours, and even thoſe whoſe ſituation in life but ill accords with ſuch additional expence, are forced to follow the example; by which means, extravagance in the maintenance of ſervants has arrived at its preſent height, and ſeems to be daily gaining ground.

If the preſent mode of maintaining farm-ſervants in England is wrong, in an agricultural or œconomical point of view, it is equally ſo in a political one. That ſubordination of rank, which it is ſo neceſſary to be kept up in every well-regulated community, is, by this practice, in a great meaſure done away. The ſervants faring as well as their maſters, and in many inſtances eating in the ſame apartment, muſt in time, if no alteration

alteration takes place, give them ideas ſubverſive of order, and good government.

The wages paid for agricultural labour, either to ſervants by the year, or to labourers by the day, throughout the better cultivated parts of Great Britain, although conſiderably different, are nevertheleſs much leſs ſo than might have been expected, and appear by no means ſufficient to counterbalance the advantages which are derived from ſuperior climate, and more favourable ſituation in regard to markets.

The expenſive manner in which the farm-ſervants are maintained in the greateſt part of England, when compared with that in the more improved parts of Scotland, creates a much greater addition to the expence of cultivation in the former kingdom, than that ariſing from the difference in the money-price of labour.

In forming a juſt eſtimate of the difference which takes place in the expence of cultivation in particular diſtricts beyond that in others, it is neceſſary, to conſider not only the ſum of money paid as wages, and the expence of maintaining ſervants, but alſo the quantity of work performed, and the number of men and horſes which, according to the practice of particular diſtricts, are conſidered as neceſſary to cultivate the ſame quantity of land.

The following ſtatement will ſhow, at one view, the difference in expence of keeping a team

team by the year, and of plowing an acre of land in Glouceſterſhire, where five horſes are commonly uſed; and in the county of Angus, where only two are conſidered neceſſary.

GLOUCESTERSHIRE.				The COUNTY of ANGUS.			
Ploughman's wages,	L. 10	0	0	Ploughman's wages,	L. 10	0	0
Board, 6s. *per* week,	15	12	0	Board, generally under	8	0	0
Boy's wages, -	5	0	0	Maintenance of two horſes, at L. 15 each,	30	0	0
Board, 4s. 6d. *per* week,	10	8	0				
Maintenance of five horſes, at L. 15 each,	75	0	0	Tear and wear of do, and accidents, L. 2 each *per annum*,	4	0	0
Tear and wear of do, and accidents, L. 2 each *per annum*,	10	0	0		L. 52	0	0
	L. 126	0	0				
Brought over,	52	0	0				
	L. 74	0	0				

Difference in expence *per annum* againſt the Glouceſterſhire farmer.

Suppoſe theſe men and horſes were employed in ploughing the whole year, and that they plough an acre a-day, they will each have ploughed 313 acres in the courſe of the year. The expence to the Glouceſterſhire farmer would be 8 s. each acre, while the Angus farmer would have the ſame extent of labour performed at about 3 s. 4 d. *per* acre. There is alſo as great a difference in the expence of thraſhing grain. Since the introduction of thraſhing machines in Scotland, the grain can be ſeparated from the ſtraw, upwards of fifty *per cent.* cheaper, and to better purpoſe

purpoſe than is done in England by manual labour. This compariſon might be made to include other operations, which are more or leſs expenſive to perform, in conſequence of the peculiar cuſtoms and practices of particular diſtricts. Theſe will be taken notice of in other parts of this work. All that is propoſed here is, to give an idea of the proper mode of calculating the expence of agricultural labour, and an inſtance or two of the ſaving which every farmer has in his power to make, by uſing well-conſtructed implements of huſbandry, and performing the various operations with as few men and horſes as poſſible.

In the preceding pages, an account has been given of the rate of wages in ſeveral parts of Great Britain. The cauſes which appear to have affected the price of labour have been explained; the different modes in which farm-ſervants and labourers are maintained, have been pointed out, and a compariſon made of the expence of cultivation between one county in England and another in Scotland. It now remains to take notice of the prevailing complaint of the want of labourers; the meaſures to be adopted, whereby that inconvenience may be moſt effectually removed; and to conclude the chapter with ſome general obſervations on the means by which the ſituation of the peaſantry may be improved.

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The ſcarcity of farm-ſervants and day-labourers, has of late been conſiderably felt in many parts of Great Britain, and ſeems to be gradually increaſing. The principal cauſes to which this evil is to be aſcribed, are the incloſure-bills in England; the enlarging or engroſſing farms in both kingdoms; and the general increaſe of commerce and manufactures.

Very great numbers of incloſure-bills, have within theſe few years been carried into effect in England, under the direction of commiſſioners appointed by the various acts of Parliament paſſed for that purpoſe. The injudicious manner in which theſe commiſſioners have in many inſtances acted, by taking from the cottagers their rights of commonage, and giving them a piece of money in lieu thereof, in place of an allotment of land in property, has deprived many thouſands of the means of living comfortably in the country, and obliged them to betake themſelves to ſome adjoining town or village.

Incloſure-bills, when carried into effect on ſound pripciples, are highly proper, as being a foundation for the future improvement of the country. But in all ſuch caſes, the national intereſt, as well as that of the individuals more immediately intereſted, ought to be attended to; when that is not the caſe, although individuals are benefited, the public muſt ſuffer. For inſtance, it is now propoſed to paſs a general incloſure-bill. Should that bill contain no pro-

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per clauſes, whereby a compenſation ſhall be given in property-land, to all cottagers having right of commonage where poſſible, it will be an act of impolicy, for which there can be no excuſe; as it would have, in ſome degree, the ſame effect with paſſing an act of Parliament for the depopulation of the country.

The enlarging or ingroſſing farms, is certainly a meaſure unfavourable to the population of the country; as many families are thereby compelled to remove from a comfortable ſituation. In a national view, it is diſadvantageous, in ſo far as a cottage in the country is a better nurſery for rearing children, than a garret in a town. From the very rapid advances which improvements have made in Scotland within theſe twenty or thirty years, the depopulation of the country by enlarging farms, without building a ſufficient number of cottages, is more apparent, than that ariſing both from the incloſing bills that have been paſſed, and the enlarging the ſize of farms in England. But it will not be diſputed, that the population of the country, part of both kingdoms has decreaſed, while that of the towns and villages has increaſed.

The increaſe of commerce and manufactures is frequently aſcribed, as the ſole cauſe of the ſcarcity of labourers. From what has been obſerved above, it appears there are other cauſes, and ſuch as muſt have weight with every perſon

who beſtows attention on the ſubject. That the commerce and manufactures of theſe kingdoms have increaſed to a very great degree, is a fact eſtabliſhed beyond all contradiction; and that this circumſtance has had an effect in creating a ſcarcity of labourers, is equally obvious.

The deficiency of labourers is an evil of ſo ſerious a nature, (from whatever cauſe it has originated), as ought to induce proprietors and farmers of all deſcriptions, to adopt ſuch meaſures, as appear moſt proper for inſuring a future and more abundant ſupply.

That which ſeems the moſt likely to effect this deſirable object with the greateſt certainty, is the building of cottages on every farm, in numbers proportioned to the extent of hands neceſſary for its cultivation. Experience has proved, that cottages are the beſt nurſeries for uſeful farm-ſervants and labourers; and while nothing would tend ſo ſpeedily or ſo effectually to ſupply this defect, as affording the labouring claſs of people the means of living comfortably in the country, it would alſo be the means, in a great degree, of ſilencing the riſing clamour againſt enlarging or engroſſing farms.

It has of late become the faſhion, to tax huſbandry; a ſyſtem of finance which may be pronounced new in the hiſtory of this country. The tax on horſes, as it muſt be productive, will in all probability, not only be continued, but increaſed,

ſed, as the exigences of the State become more preſſing. Taxes on the cultivation of the ſoil, muſt be conſidered by every judicious perſon as extremely impolitic, at leaſt while a ſingle article of luxury remains free. At the ſame time, there are ſome taxes, that might with propriety be impoſed on the huſbandry of theſe kingdoms, which, although they might not long continue to be productive, could not fail to be highly beneficial in their conſequences, and be the means of promoting the advancement of that art, which a ſuperficial obſerver would imagine they were intended to depreſs. Among theſe, one in particular appears to merit attention; namely, a tax on every proprietor and farmer in Great Britain, who had not as many cottages erected and inhabited in a limited time, as there were ploughmen required for the cultivation of the farm; or, one cottage for every certain number of acres. Such a tax, if impoſed for the expreſs purpoſe of increaſing the population of the country, and thereby keeping the price of all kind of labour moderate, could not fail, in time, to have the wiſhed for effect.

When a ſcarcity of labourers happens in a thriving and improving country, it is a national misfortune, the removal of which merits the moſt ſerious attention of the Legiſlature. If ſome effectual meaſures are not ſpeedily adopted by Government, in order to bring about a more abundant

bundant ſupply of labourers, the period does not appear far diſtant, when the merchant and manufacturer, in conſequence of the increaſing rate of labour, and the additional taxes with which they are ſo liberally loaded, will find themſelves underſold in foreign markets. While the farmers will be under the neceſſity (in place of benefiting by the labours of the national Board of Agriculture), of purſuing the already too prevailing practice, of allowing their lands to remain in graſs, in order to avoid the extravagant expence of cultivation.

The practice of joining two or three, ſometimes half a dozen ſmall farms in one, and the conſequent demolition of cottages, has had the effect of bringing about a great alteration in many counties, in the deſcription of ſervants employed in huſbandry.

Formerly, the ploughmen (called hinds) were married men, who lived in cottages within a reaſonable diſtance of the farm-yard. They received a ſmall ſum of money in name of wages, in order to purchaſe cloaths and other articles. Beſides a houſe and cabbage garden, they had a ſtipulated allowance of grain or meal; their fuel carried home; a certain extent of land aſſigned them for planting potatoes, and ſowing flax. And in addition to all this, they had each, a cow kept all the year. Thus they lived, enjoying an abundant ſupply of all the neceſſaries of life,

and

and expreſſing by acts of attention and fidelity, their gratitude to their employer, whom they conſidered (as the ancient clans did their chieftains) as the father of that little community of which he was the political head.

Young men are now generally employed as ploughmen, many of them are brought up in cottages on the edges of commons, or in the remote and leſs cultivated parts of the country; but by far the greater number in villages. Their wages are paid wholly in money; and being a greater ſum than many of them can manage with prudence, it is for the moſt part expended in the purchaſe of fine cloaths, or waſted in debauchery.

Which of theſe two characters is likely to prove the moſt uſeful and faithful ſervant, is a queſtion that may be eaſily decided. The former having his family living under the protection of his maſter, is bound by intereſt as well as gratitude, to pay attention to the proper diſcharge of his duty. While the latter, having only formed a ſlight and temporary connection, performs his work with a careleſs indifference as to the conſequences.

From the advantages to be derived by employing married men, who have families reſiding on ſome detached part of the farm, as ploughmen, as well as from the acknowledged ſcarcity of labourers, may be inferred the propriety, and even

even neceſſity of improving by every proper means the ſituation of the peaſantry.

The labourer's ſituation would be much improved, were his employers to revert to the old practice of paying him a great part of his wages in the neceſſary articles of proviſions; he would then be prevented from the neceſſity of having recourſe for every article he requires to thoſe worſe than pawnbrokers, the keepers of the little paultry chandlers ſhops; a ſet of people, who, without remorſe, appropriate to themſelves, under the name of a reaſonable profit, a great proportion of the hard-earned wages of the laborious peaſant.

The moſt illuſtrious character in the kingdom, has reſolved to pay thoſe who are employed on his farm, ſuch a proportion of their wages in meal and butcher-meat, as may be judged neceſſary for the ſupport of their families; both of which are to be delivered to them ſomewhat under the market-price. This example ſet by his Majeſty, who may juſtly be denominated the father of his people, highly merits the attention of every proprietor and farmer in Great Britain; and if generally followed, will add greatly to the comfort and happineſs of an uſeful and deſerving ſet of men, who through a life of toil and labour, in general, remain ſatisfied with that ſtation which Providence has aſſigned them.

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Next to getting the great article of provifions on reaſonable terms, the allowing every cottager the means of keeping a cow, and of planting a reaſonable quantity of potatoes and other vegetables, would tend more than any other circumſtance to his happineſs and comfort; as it would enable him to procure a conſiderable ſhare of the ſuſtenance of his family, without the expenditure of money, or the riſk of impoſition.

It would be a great ſpring to the induſtry of the labourer, to ſet him all his labour by the great, or piece. He would be induced to labour with more ſteadineſs and perſeverance, when he was ſatisfied that it was in his power to apply the fruits of his extraordinary exertions to the benefit of his family.

To encourage, by every proper means, the eſtabliſhment of friendly ſocieties, among the labouring claſs of people, is an object that merits all due attention. Theſe ſocieties having now received the ſanction of the Legiſlature, in ſo far that an act of Parliament is paſſed for the protection of the property ſo inveſted, it is to be hoped, that gentlemen of conſequence in every diſtrict, will not only uſe their endeavours to ſet ſuch ſocieties on foot, but alſo to countenance them in their infancy. There are few labourers who cannot ſpare 1s. or 1s. 3d. a month. And in no way can that ſum be better applied; as, in caſe of accident, or ſickneſs, he would

from such payments, after one year, be entitled to from five to seven shillings a week, according to the general plan of these societies.

These are the essential measures that appear necessary to be adopted, in order to render the situation of the labourers or peasantry more comfortable. They are neither numerous nor expensive in the execution, nor calculated to affect the interest or happiness of individuals in any other rank. Yet such as they are, if put in practice, the consequences would be highly favourable to that class of men, and extremely beneficial to the nation.

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CHAPTER X.

Price of Provisions, and the Reasons why it is higher in some Districts than in others.

BEFORE the extension of internal commerce, and that easy and commodious communication that has with much labour and expence been effected between one place and another, by means of turnpike-roads, and inland navigation, the price of provisions was at times more than double in some districts beyond what it was in others. For example, in the year 1258, a quarter of wheat cost 20s. at Northampton, at the same time that it was sold at Dunstaple, now Dunstable, (the distance only 33 miles), for 8s. 6d.* On the other hand, during last summer, the scarcity of grain appeared all of a sudden, very great in England, while it was abundant in Scotland. When owing to the publication of some minutes of the Privy Council relative thereto, the spirit of speculation, for which

* Annal. Dunstap. ann. 1258.

which the Engliſh nation is ſo remarkable, was ſet afloat. The conſequence of which was, an immediate exportation from the one kingdom to the other, to ſuch an extent, as to lower the price in the one, and raiſe it to ſuch a degree in the other, as to bring it nearly on a level excluſive of the expence of carriage in the courſe of little more than two months.

As an account of the origin and preſent ſtate of the markets, eſtabliſhed for the ſale of the ſuperabundant produce of the country, will be taken under conſideration in a ſubſequent Chapter, the preſent ſhall be confined to a ſtatement of the general prices of the articles of proviſions in common uſe, and the reaſons why they muſt neceſſarily be higher in ſome parts of Great Britain than in others.

The moſt indiſpenſable of all the articles of proviſions, and that which claims the firſt place, is,

Grain.—From the accounts of the prices of grain in every diſtrict, publiſhed by authority, there is generally a conſiderable difference, even in the preſent period, and in ordinary years. Several cauſes may be aſſigned for this difference. The quality of the grain; the variation in the meaſure; the abundance of the harveſt in ſome parts of the iſland, above that in others; ſome large cities and manufacturing towns being obliged to receive their chief ſupplies from a diſtance;

ſtance; and in ſome caſes, the ſyſtem of huſbandry adopted; all theſe have a conſiderable effect on the price of grain.

The variableneſs of the climate in general, and its ſuperior excellence in ſome parts of the iſland beyond that in others; as well as the variety of ſoils, and modes of cultivation practiſed; are reaſons ſufficient to account for that difference ſo viſible in the *quality* of the Britiſh grain.

The true criterion by which to judge of the quality of grain, is the quantity of meal, or of ale, or ſpirits, of a certain ſtrength or proof, which it yields. If the barley of Norfolk will yield one-third more of either, than the barley of Cumberland or Weſtmoreland; two quarters of Norfolk barley at 30 s. the quarter, is a better bargain to the manufacturer or conſumer, (by requiring leſs labour), than three quarters of the growth of the two laſt mentioned counties, at the rate of 20 s. the quarter. If, again, a quarter of Eſſex or Hertfordſhire wheat yields one-fourth more meal, than (in conſequence of the moiſtneſs of the climate) a quarter of Lanarkſhire wheat will produce; three buſhels of the former are equal in value to four of the latter. It is alſo evident, that the better the quality of the grain, the more nutritive will be its produce in meal.

London is not only the emporium of the commerce of Europe, but alſo of the internal commerce

merce of this island. Grain is sent to that market in greater or lesser quantities from almost every district in the united kingdoms, where there happens to be a superabundance. The Winchester standard bushel of eight gallons, is the measure by which all kinds of grain sold in Mark-lane is delivered. In order to exhibit the variety of the prices at which the several species of grain are there sold, the prices of one day, *viz.* the 8th July 1794, are here stated.

Wheat,	40 s. to 54 s. 6 d.	per quarter.
Barley,	25 s. to 28 s.	
Oats,	18 s. to 26 s.	
Rye,	26 s. to 30 s.	

In East Lothian, where there is as great a difference in climate, soil, and modes of husbandry, as in any other district in the kingdom, the grain sold weekly at Haddington, the county-town, generally varies considerably in price. That sold on the 4th of July 1794, was as under:

	First Sort.	Second Sort.	Third Sort.	
Wheat,	27 s.	24 s. 6 d.	22 s. 6 d.	per boll.
Barley,	24 s.	23 s.	22 s. 6 d.	
Oats,	19 s.	17 s. 8 d.	15 s.	
Beans,	18 s. 4 d.	16 s.	14 s. 6 d.	
Peafe,	19 s. 6 d.	17 s. 10 d.	15 s. 4 d.	

The difference in the prices above quoted is a moft concluſive argument to prove, that the the quality of grain in a great meaſure regulates its

its price. In the former inſtance, the various qualities of the grain ſent from every part of Great Britain to the London market, are determined by compariſon, and the price or real value thereby aſcertained. The ſame thing happens in the county of Eaſt Lothian, although on a ſmaller ſcale. In the corn-market of Haddington, the grain from the higher and more remote parts of the diſtrict, and where improved agriculture is not general, is ſold at an inferior price, compared to that cultivated under a better climate, in richer ſoils, and by more expert farmers.

The variations in the meaſures by which grain is generally ſold and delivered all over Great Britain, is another reaſon for a difference in price. Without entering at preſent into an inveſtigation of the variety of weights and meaſures by which grain and butcher-meat in particular are ſold in theſe kingdoms, or of the abſurdity of continuing a practice which is the cauſe of ſo much confuſion, it is only neceſſary to obſerve, that the buſhels by which grain is delivered vary in ſome counties in England from eight gallons, which is the Wincheſter ſtandard, to ten, which is called the cuſtomary buſhel.

The writer has had an opportunity of ſeeing mealmen (millers) purchaſing wheat in ſeveral market-towns of that kingdom, and has frequently been ſurpriſed to ſee them offer the ſame price

price for wheat of different qualities. On explanation, the reaſon aſſigned was perfectly ſatisfactory. One man was to deliver his wheat with a buſhel of eight gallons, while others uſed one of eight and a half, nine, nine and a half, or ten.

The firlots * in Scotland (the meaſures by which grain is ſold in that kingdom) vary in every county, and in ſome to a conſiderable degree. The firlots uſed in Inverneſs-ſhire, are ſo much larger than thoſe at Leith, (the ſea-port of Edinburgh), that the ſurplus meaſure is fully equal to the freight and all other charges incurred, by ſending a cargo of grain from the one place to the other. The diſtance by land is upwards of 200 miles; and the navigation, owing to many headlands, and in ſome places rugged and broken coaſts, is perhaps three times that diſtance. Theſe are circumſtances that muſt obviouſly tend to create a difference in the price of grain.

The price of grain is always affected in particular diſtricts, by the abundance or deficiency of the preceding harveſt; and the ſame cauſe frequently tends to advance or depreſs the price at the great national market of London, which in a greater or leſs degree regulates all others in the united kingdoms.

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* There are two firlots uſed in Scotland; the one, which is by much the largeſt, for meaſuring barley and oats, the other for wheat, peaſe, beans and rye.

In every diſtrict, there are ſome farmers who are obliged to diſpoſe of a conſiderable quantity of their grain, ſo ſoon as they can get it thraſhed, to enable them to pay their rents, and other demands that come upon them, ſoon after the cloſe of harveſt. When there is any conſiderable reverſion of the former year's crop on hand, the grain thus brought to market is generally ſold on very moderate terms; and theſe terms are ſtill further reduced, by the neceſſity that this deſcription of farmers is under, of bringing a greater quantity to market in conſequence of the reduction of price. On the other hand, when the former year's ſtock is nearly exhauſted, and a deficiency happens in the harveſt, although a certain portion of the grain muſt come to market as ſoon as thraſhed; yet the demand being greater, and the price of courſe higher, a leſs quantity is neceſſary to produce the ſame ſum.

The provincial markets are generally regulated for ſome months after harveſt, by the circumſtances before mentioned. During that period, thoſe who are engaged in the corn-trade, learn, by their correſpondence, to what ports, if there is a ſurplus, they can export, or whence, in caſe of a deficiency, they can import. During the remainder of the year, or till the return of next harveſt, grain, like other things, becomes an article of commerce; and the price is regulated

lated by the extent of the demand, and the expence incurred in ſending it to market.

Although a partial abundance, or deficiency of a crop, in particular diſtricts, has no perceptible effect on the markets in London, and the other large cities and manufacturing towns; yet when the harveſt is generally abundant throughout the iſland, or (as we have fatally experienced for theſe two laſt years) is greatly deficient, the London market, as well as every other, is materially affected thereby.

When there is abundance of grain in the nation for the ſupply of the inhabitants without importation, the price, in conſequence of the operation of the exiſting corn-laws, is kept moderate: But where there is a general deficiency, and recourſe muſt be had to large importations from foreign countries, the price muſt greatly exceed the ordinary rate. The Britiſh importer, the foreign agent, the ſhip-owner, the mariners, and the underwriters, muſt all be paid; ſo that a general good or bad crop, has nearly the ſame effect on the national markets at large, as the one or the other has on the provincial markets, where a local abundance or ſcarcity takes place. The only material difference is, an increaſe in the expence of importation from foreign nations, beyond that of tranſportation from one diſtrict to another.

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It is a ſingular circumſtance, and worthy of remark, that London, Edinburgh, and a few other towns excepted, the principal ſeats of Britiſh commerce and manufactures, are ſituated on the weſtern ſide of the iſland. Several of them are adjoining to extenſive tracts of waſte and unproductive lands, whence it is impoſſible the inhabitants could ever have entertained a hope of drawing any conſiderable ſupply of proviſions. Were it proper here to enter on the ſubject, ſufficient reaſons, in a commerical view, might be aſſigned to ſupport this apparently improper choice of ſituation. It is, however, attended with one diſadvantage; namely, an additional expence of inland carriage on grain, in conſequence of the great diſtance whence in general it muſt be brought; particularly, if it be ſuppoſed, that by a great national exertion, it is poſſible, in ordinary ſeaſons, to raiſe ſuch a quantity in the country, as is equal to the conſumpt of the inhabitants.

The eaſtern and ſouthern coaſts, together with ſome of the midland diſtricts, are the moſt productive of grain. They are more level, better cultivated, and enjoy a more favourable climate, than the weſtern and northern diviſions. Therefore, notwithſtanding the canals that are carried acroſs the iſland, ſome of which may be ſaid to join the Atlantic to the German Ocean; yet the tolls, or pontage paid on theſe, added to the other neceſſary charges, greatly augment the

price of all grain tranſported by inland navigation.

As a city or town increaſes in ſize and population, a greater extent of country is required to ſupply it; and of courſe, the price of grain increaſes, although not always in proportion with that of ſuch articles as cannot be carried to a great diſtance. The ſituation of a town, in any country like that of Great Britain, which is frequently obliged to depend on foreign importation for a ſupply of grain, is of the moſt material importance. The average price of grain in London, for inſtance, which is ſituated in a corn-country, and has the advantage of the greateſt port of ſhipping in the united kingdoms, is commonly lower than the general average of all the counties of England taken together. It is conſiderably under that of Derby, Stafford, Leiceſter, Northampton, and ſeveral other inland counties. Some counties are obliged to purchaſe annually large quantities of grain; and, owing to their ſituation, they are ſubjected to the expence of land-carriage, or to that of a long and tedious inland navigation. This greatly enhances the price beyond that in thoſe counties which, being cultivated to a greater extent, can ſpare a ſurplus, or which, in conſequence of their proximity to the ocean, are enabled to import at a comparatively ſmall expence.

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On the whole, it is evident, that the expence of the carriage of grain to any conſiderable diſtance, whether by ſea, by inland navigation, or by land-carriage, muſt have the effect to advance the price.

The laſt circumſtance to be taken notice of, in regard to the reaſons why the price of grain, muſt neceſſarily be higher in ſome parts of Great Britain than in others, is the ſyſtem of huſbandry generally adopted in particular diſtricts. In the county of Leiceſter, where the grazing ſyſtem prevails, and where the quantity of grain cultivated is by no means equal to the conſumpt of the inhabitants; the price of grain raiſed in the county, muſt be equal to that (including the expence of carriage) which is imported from other diſtricts.

Where the cultivation of grain is the chief object of the farmers, as in Norfolk, the price muſt be frequently fluctuating, according to the riſe or fall of thoſe markets to which the ſuperabundant produce is ſent; but it muſt always be cheaper in Norfolk than in thoſe markets, to defray the expence of tranſportation, and to allow a reaſonable profit to thoſe concerned therein.

Butcher Meat.—The price of butcher meat, the difference of weight conſidered, is wonderfully the ſame in every town of any magnitude in Great Britain, London excepted. The price,

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it is true, advances like that of other articles, and alſo varies with the ſeaſons; but it advances and varies equally almoſt in every market. There is, however, a great difference in the price of ſome particular pieces beſides others, which is eaſily accounted for. Butcher meat being in general equally the food of the poor as of the rich, over a very large proportion of theſe kingdoms, the greateſt ſhare is ſold for the ſubſiſtence of the labouring part of the community. The fancy of individuals in the higher ranks, or the faſhion of the times, frequently ſtamps an imaginary value on ſome particular pieces; while others, equally uſeful for the food of man, are ſold at inferior prices. This variation in the prices of the different parts of the ſame animal is, however, alſo general in every market, and an aſtoniſhing equality in that reſpect prevails throughout the whole.

In writing or ſpeaking of the prices of butcher meat, the higheſt averages are generally ſtated. The higher average prices of the choice pieces of butcher meat in all the principal market-towns, may be rated as follows, *viz.*

	Average.	
Beef, from 3 d. to 4½ d.	3¾ d.	*per* pound of ſixteen ounces.
Mutton, from 3½ d. to 4½ d.	4 d.	
Veal, from 4 d. to 5 d.	4¼ d.	
Lamb, from 4 d. to 4½ d.	4¼ d.	
Pork, from 4 d. to 5 d.	4½ d.	

Thoſe

Thoſe who are engaged in the manufacture of any particular article, for which there is a regular and conſtant demand, and who know that thoſe employed are barely able to furniſh a ſufficient ſupply, muſt alſo know, that the price of that article is leſs fluctuating, than the price of thoſe articles for which the demand is ſometimes greater and ſometimes leſs. The ſame obſervation holds true, in regard to the equality in the price of butcher meat. Although luxury has increaſed, ſo as to create a much greater demand *; yet, in conſequence thereof, a greater proportion of the lands of theſe kingdoms is now allowed to remain in graſs than formerly, and the ſupply of fat cattle and ſheep that can be furniſhed, being about equal to the demand, the price therefore continues regular.

The want of a market for any conſiderable number of fat cattle and ſheep, in ſome parts of theſe kingdoms, has an effect in keeping the price of butcher meat moderate, and of bringing it more to a level in large cities and manufacturing

* There is no town of any magnitude in either kingdom, where the number of fat cattle and ſheep now killed is not much greater than it was thirty years ago; beſides, ſince the introduction of a regular ſucceſſion of green food, the ſize both of the cattle and ſheep is greatly increaſed. In Scotland, eſpecially, they are nearly double the weight they were at the period above mentioned.

facturing towns, where the demand is greater than can be ſupplied from the ſtock in the more immediate neighbourhood. The farmers, in thoſe places where there is no conſiderable demand for fat ſtock, generally turn their attention to breeding and rearing cattle and ſheep. Theſe, when arrived at a proper age, are diſpoſed of to graziers in thoſe diſtricts, where, from local circumſtances, the demand for butcher meat is greater than could poſſibly be ſupplied, if the lands were not chiefly devoted to grazing and paſturage. This will be more fully illucidated in treating of the markets for the agricultural produce of the country; when it is propoſed, to give an account of the principal roads through which the cattle from Scotland travel to the ſouth of England, and the ſeveral fairs or markets, at which numbers of them are ſold in their progreſs ſouthward.

Another reaſon may be aſſigned, for ſo little variation taking place in the price of butcher meat. Fat cattle and ſheep may be ſent to market at a conſiderable diſtance at a ſmall expence; ſo that, if the markets in the neighbourhood are at any time over-ſtocked, thoſe more remote are ſtill within reach. Fat ſheep have been ſent almoſt from the banks of the Tweed to Wakefield in Yorkſhire; a diſtance of upwards of 150 miles; and Glaſgow, ſituated within

in little more than 20 miles of the weſtern coaſt, receives part of its ſupply of fat cattle from the county of Angus, on the oppoſite ſide of the iſland.

The price of butcher meat is always nearly a penny the pound higher in London than at Liverpool, Manchester, Edinburgh, Glaſgow, or any other of the great markets in the united kingdoms. The very great additional average diſtance, whence ſupplies muſt be drawn to that immenſe capital, beyond that to any other place, is one principal reaſon of this advance in price; and another is, that a greater proportion of the total quantity ſold in London is ſuperior in quality to that expoſed for ſale in any other market,

Poultry and Eggs.—Theſe are more variable in price in the ſeveral markets of Great Britain than any other article of proviſions. The following comparative ſtatement of the prices, in very different parts of the iſland, will give an idea of the extent of the variation.

Prices within reach of the London market.		Prices in the remote parts of Wales and Scotland.	
	Aver.		Aver.
A fowl, fr. 1s. 4d. to 1s. 8d.	1s. 6d.	A fowl, from 4d. to 5d. -	4½d.
A duck, from 1s. 6d to 2s.	1s. 9d.	A duck, from 4d. to 6d. -	5d.
A gooſe, from 4s. to 5s.	4s. 6d.	A gooſe, fr. 1s. 4d. to 1s. 8d.	1s. 6d.
A turkey, from 5s. to 6s.	5s. 6d.	A turkey, from 1s. 6d. to 2s. 6d.	2 s.
Eggs, *per* doz. fr. 6d. to 10d.	8 d.	Eggs, *per* doz. from 2d. to 4d.	3d.

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By adding the above two averages together, and taking the one-half of each, a general average price of poultry and eggs may be afcertained with as great a degree of correctneſs as the nature of the ſubject will admit, as, excluſive of London, they contain the higheſt and loweſt rates in all the other markets.

General Average Price of Poultry and Eggs in the Markets of Great Britain at large.

A fowl, 11¼ d.
A duck, 1 s. 1 d.
A gooſe, 3 s.
A turkey, 3 s. 9 d.
Eggs, 5½ d. *per* dozen.

Poultry and eggs being conſidered as articles of luxury, and, for the moſt part, conſumed at the tables of the wealthy, the price muſt of courſe vary with the extent of the demand, and the eaſe or difficulty of procuring them.

In the remote parts of the country, where few of this deſcription of people conſtantly reſide, the demand is inconſiderable, compared with the extent of the ſupply that can be furniſhed; and the price being regulated by that circumſtance, muſt be low. Wherever commerce or manufactures are carried on to a great extent, or indeed

deed where crouds of people are collected together, from whatever cauſe, the price of theſe articles muſt advance in proportion to the increaſed demand, and the additional extent of country requiſite to ſupply that demand. This is fully exemplified in the great additional price at which all kinds of poultry are ſold in London beyond that in any other market in the kingdom. When it is conſidered, that London is in a great meaſure ſupplied with turkies from Suffolk, at a medium diſtance of nearly an hundred miles; and with geeſe from Lincolnſhire, diſtant not leſs than one hundred and fifty; and that between the breeder and the conſumer, a great many people are employed in furniſhing theſe ſupplies; it is obvious, that on articles which are originally of little value, the price muſt be greatly advanced. This alſo accounts for the extraordinary price at which eggs are ſold in London. It is found impoſſible to procure a ſufficient ſupply from the country around, therefore recourſe is had to diſtant markets. Eggs are frequently imported from France; and it is generally and poſitively aſſerted, that L. 20,000 worth of eggs are annually ſent from the port of Berwick-upon-Tweed to the London market. If, to the firſt coſt is added the expence of package and carriage, the riſk of breakage, and the profit of the London dealer; the extraordinary price at which they are ſold, cannot be deemed

extravagant. One other circumſtance may be mentioned, as affecting the price of theſe articles in all ordinary markets, namely, the ſize of farms within that circle, whence they receive their ſupplies. If the farms are generally ſmall, the ſupply is large, and the price moderate; but if the farms are for the moſt part large, the extent of theſe articles uſed in the farmers families is conſiderable; a leſs quantity is ſent to market, the demand becomes greater, and the price of courſe enhanced.

Milk.—As milk is an article that cannot poſſibly be carried to any great diſtance, the market price muſt be regulated chiefly by the extent of the city or town to be ſupplied. The price of milk in London is threepence the quart; and in Edinburgh, three halfpence, which laſt may be conſidered as the medium price in all populous towns in theſe kingdoms. The rent of land and the price of labour muſt no doubt have ſome effect in regulating the price of this article, but they operate little in compariſon of an increaſed demand, ariſing from an increaſe of population and proſperity.

Butter and Cheeſe.—The price of ſweet butter is as variable in the different counties as it is in each at the different ſeaſons. There is a great difficulty in aſcertaining a general average price, eſpecially

eſpecially in Scotland, owing to the difference of weights by which it is ſold, a pound of butter varying in that kingdom from twenty-two to twenty-eight ounces, and conſiderable variations are to be found even in the ſame county.

The following may, however, be conſidered as pretty nearly the general prices:

	In Summer.	Average.	In Winter.	Average.	General Average for the Year.
In Eng.	fr. 7d. to 9d.	8d.	9d. to 11d.	10d.	9d. per pound of ſixteen ounces.
In Scot.	fr. 6d. to 7d.	6½d.	7d. to 9d.	8d.	7½d. per pound of ſixteen ounces.

Salt butter being an article of more general commerce, the price is leſs variable; and is commonly regulated by the demand at the London, Liverpool, Briſtol, Edinburgh, and Glaſgow markets. The prices which the London factors have allowed the dairy-farmers in England, for ſeveral years paſt, have been from 35 s. to 40 s. the firkin of 56 pounds, that is, from $7\frac{1}{2}$ d. to $8\frac{1}{2}$ d. the pound of ſixteen ounces, which are ſomewhat above the prices at which ſalt butter is retailed in Scotland.

The difference in the prices of butter in England and Scotland, as above ſtated, may be aſcribed to two cauſes. The firſt is owing to a more general demand for that article in England, in conſequence of the great body of the peaſantry making it an article of common uſe; whereas in Scotland, it is only uſed by the higher and middle ranks. The ſecond is, that the butter

butter expoſed to ſale in Scotland is inferior in quality to that ſold in the public markets in England; although the butter made in Scotland for the uſe of private families is much ſuperior to the general run of Engliſh butter, and in many caſes rivals that of Epping foreſt, which has been ſo long, ſo much, and ſo juſtly celebrated.

Cheeſe may be ſtated at from twopence halfpenny the pound, (which is the retail price of common cheeſe made in Scotland for ſale) to ſixpence three farthings, or ſevenpence, at which the beſt Cheſhire is in ſome places ſold. There is perhaps no article, the produce of a farm, of which the quality varies ſo much as cheeſe. The cheeſe made in the counties of Cheſter, Glouceſter, and Wilts, is as ſuperior to that made from ſkimmed milk in Suffolk, as what is made in the counties of Renfrew and Ayr, and known by the name of Dunlop cheeſe is to that made for ſale in any other part of Scotland. It is no wonder, then, that there ſhould be ſuch a difference in the price of an article, the value of which is almoſt entirely regulated by its quality.

On reviewing the preceding account of prices for the various articles of proviſions, and of the reaſons aſſigned, why they are higher in ſome places than in others; the advantages or diſadvantages reſulting from local ſituation, in

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regard to markets, muſt be obvious. Theſe are much greater either way, and are of more importance in the choice of a farm, than other matters, which are frequently conſidered as meriting more attention. Every market has a certain circle around it, whence its ſupply of proviſions is furniſhed; therefore the farmer, who reſides near the centre of that circle, muſt neceſſarily enjoy a great advantage over him who is ſituated at the extreme bounds.

CHAP-

CHAPTER XI.

Classification *of different* Soils.

The ſuperficial *ſtratum* of the earth is ſo well known to farmers by the general name of ſoil, that no further deſcription is requiſite. Soils are various in their natures and qualities, being compounded of ſubſtances very different from each other. They are alſo of various depths, and have under them other *ſtrata*, generally denominated ſub-ſoils; from the nature and properties of which, the quality of the ſurface ſoil is for the moſt part determined. The depth of the ſoil, and the nature and quality of the ſub-ſoil, ought to be carefully examined by every perſon who rents a farm. Experience every day proves, and it is well known to all practical farmers, that the richeſt ſoils, when only a few inches deep, and lying on a bed of wet clay, rock, or chalk, are not ſo productive as thoſe of inferior quality, on a dry, free, gravelly bottom, where the plants can with eaſe puſh their fibrous

fibrous roots to a conſiderable depth in ſearch of food.

Provincial writers on huſbandry frequently characteriſe the ſeveral ſoils under local names; as *ſtone-braſh*, *black-growan*, *ſhelfy-ſoil*, *ſkirty land*, &c. whereby a reader is, on many occaſions, at a loſs to form a correct idea as to the ſort of ſoil intended to be deſcribed.

The ſoils of Great Britain may be divided into the clayey, the marſhy, the loamy, the rocky, the ſtony, the chalky, the gravelly, the ſandy, and the moſſy. Theſe, when writing on the ſubject of national ſoils, may, without impropriety, be claſſed under four general heads, *viz.*

Clayey.
Loamy.
Sandy, or Gravelly,
and,
Moſſy ſoils.

Of each of theſe, there are, it is true, great varieties, according to the different proportions of that kind of earth which preponderates, and from which that particular ſort of ſoil receives its denomination. Yet every variety of ſoil in theſe kingdoms may be included under one or other of theſe heads, ſo far at leaſt as is neceſſary for the preſent purpoſe.

As theſe four great diviſions of Britiſh ſoil are very different from each other, it may be uſeful by deſcribing their natures and qualities, to explain wherein that difference conſiſts, and at the ſame time to point out what kinds of manures are proved by experience to operate moſt powerfully on each.

Clayey Soil.—Clay is a tenacious, ſolid, unctuous ſort of earth, of various colours; as blue, red, white, and yellow; of theſe the yellow, or what is generally known by the name of brick-earth, is the beſt; but clay of every ſort and colour, is of all other ſoils moſt unfriendly to vegetation.

Clay ſoils are as different in their natures as in their colours. Some of them are ſo obſtinate that it is ſcarcely poſſible to ſubdue them. Others are ſo ſoft and unctuous, as to be eaſily reduced to a proper ſtate for nouriſhing plants; while others again, are ſo hungry as to abſorb, in a ſhort time, whatever kind of manure is applied, without either materially altering the nature of the ſoil, or improving the crops.

Clay being a ſolid compact body, and its particles, adhering firmly together, it does not eaſily admit water, although capable of receiving a large quantity, nor does it part with it but by ſlow degrees. When dry, it is hard and denſe, and the more rapidly water is drained off or exhaled,

led, the harder it becomes, frequently opening into little chaſms or rents, when ſuddenly dried.

As clay, from its tenacious quality, retains water longer than any other ſoil, the roots of the plants, in a rainy ſeaſon, are frequently ſoaked in water for a conſiderable time, and the plants themſelves, if not entirely deſtroyed, are ſo chilled, and weakened, as to produce very indifferent crops. On the other hand, from the natural cloſeneſs of its texture, added to the circumſtance of its hardening very quickly, and to a great degree, when the moiſture is ſuddenly extracted, the plants in a dry ſeaſon, are prevented from extending their roots in ſearch of nutriment; while the dews, and light ſummer-ſhowers, ſo eſſential to the growth of all vegetables, and which eaſily penetrate the more friable ſoils, are repelled by the clay, and again exhaled by the influence of the ſun.

After the preceding deſcription of the nature of all clay ſoils, it is ſcarcely neceſſary to mention the great importance of keeping them as dry as poſſible at all ſeaſons, eſpecially during winter. When that is properly attended to, the farmer has it in his power to plough and ſow on the firſt return of favourable weather in the ſpring; thereby, in a great meaſure, he avoids the riſk of his crops ſuffering, either from heavy falls of rain,

or a long continued tract of dry weather, particularly the latter; for when a clayey ſoil is reduced to a proper ſtate by the harrows and roller, after the ſeed is ſown, it very ſeldom happens that the crop ſuſtains any material injury from the want of rain during the remainder of the ſeaſon.

Although the nature and properties of clay ſoil be ſuch as above deſcribed, yet by induſtry, and the application of ſuch manures as are beſt calculated for correcting its bad qualities, and for bringing thoſe moſt favourable to vegetation into action, this ſort of ſoil is made to produce abundant crops.

The manures moſt proper to be applied, are lime, chalk, ſea-ſand, and aſhes. It appears from the accounts given by thoſe chymiſts who have analyzed theſe ſubſtances, that they are admirably calculated to correct the ſtubborn denſity of clay, ſo as to render it more eaſily reduceable by the plough; to open its pores, ſo that it may more readily imbibe and tranſmit water; and that they operate as a powerful ſtimulus, *and ſome way or other* diſpoſe whatever principles in clayey ſoils are friendly to vegetation to exert themſelves. Long and eſtabliſhed practice confirms this obſervation: lime, for inſtance, has been applied to theſe ſoils for many years, in the counties of Durham, Glouceſter, Hereford, Montgomery,

gomery*, Berwick, Stirling, Perth, and many other diſtricts where ſuch ſoils prevail. Chalk is uſed, both in its natural and calcined ſtates, in Hertford, Middleſex, Eſſex, Kent, Wilts; and other ſouthern counties. Sea-ſand is employed as a manure in Cornwall, Devon, Pembroke, Angleſey, Caernarvon, and alſo in ſeveral diſtricts in Scotland. Coal-aſhes, in the neighbourhood of London, are laid with aſtoniſhing ſucceſs on clay ſoils, whence brick earth has been taken. Peat-aſhes have produced wonderful effects in Berkſhire; and aſhes of both kinds are uſed to great advantage, as a top-dreſſing, on the ſtrong ſoils, in all thoſe counties where that practice is eſtabliſhed. Beſides theſe manures, compoſts, eſpecially when formed chiefly of light ſandy, or gravelly earths, with lime or chalk, are alſo applied to clay ſoils with ſucceſs, in many parts of England. Few compoſts being made on the better cultivated clayey ſoils in Scotland, the common method is, to lay on farm-yard dung, the ſame ſeaſon in which a field is limed; by adopting this practice, the lime is found to operate more rapidly, and at the ſame time more powerfully.

While it may be admitted, that by the application of ſuch manures, and proper cultivation, clayey

* Lime is frequently carried upwards of forty miles, and uſed as manure in this county;—a clear evidence, that eſſential advantages are derived from the application of it.

clayey ſoils are made to produce, occaſionally, luxuriant crops; yet to every perſon acquainted with theſe ſoils, it muſt be obvious that the crops are, upon the whole, more precarious and uncertain than thoſe on deep fertile loams.

Loamy Soil.—A loamy ſoil is compounded of diſſimilar particles, as clay and ſand, and is denominated ſtrong, or light and friable, according to the proportion of each which it contains. When the proportions are ſo combined, as to render the ſoil of a mouldering, crumbling nature, on being expoſed to the air, it is the moſt fertile of any. Loam, in its original ſtate, is generally of a brown or hazle colour, but gradually becomes darker, in proportion to the quantity of dung (of rotten animal and vegetable ſubſtances) which is from time to time applied. This is exemplified in thoſe parts of Scotland, where the diſtinction of infield and outfield ſtill remains, or where it has been only recently aboliſhed. The infields, in conſequence of the dung which has been for many ages occaſionally applied, have acquired a dark or black appearance, while the outfields, which ſeldom or never received any manure, retain their natural colour.

Loam being formed of mixture of clay and ſand, partakes of their joint properties; being more adheſive than ſand, but not ſo denſe nor obſtinate as clay. It receives water and tranſmits

mits it more readily than clay; hence it is more eaſily ploughed, and is leſs liable to be hardened by long drought, or chilled by exceſſive rains. From being more open and friable, the tender roots of plants can extend themſelves with more eaſe, and receive in greater abundance their proper food, while the influence of the ſun and air acts more powerfully on loam than on clay. Therefore, notwithſtanding, as has been already ſtated, more luxuriant crops may be occaſionally forced from clay ſoils, in particular ſeaſons, yet the ſoil properly called loamy, has been always found, on the whole, moſt favourable to vegetation; partly owing to thoſe characteriſtic properties already mentioned, and to other qualities inherent in its nature.

Loam is a ſoil on which all kinds of manure operate properly, as from its kindly nature its powers are more eaſily excited; it does not require ſuch quantities as clay does to render it productive.

Sandy or Gravelly Soil.—Sand is deſcribed as being very indifferent in its nature, and in the ſize of the particles of which it is compoſed. One kind conſiſts chiefly of ſmall pieces of flint, and another of ſmall broken ſhells; but that which is moſt proper for cultivation contains a portion of loam. As the particles of ſandy, gravelly, and what may be denominated light ſoils,

do not adhere together, conſequently theſe ſoils eaſily admit heat and moiſture; but as they as eaſily part with them, they are not ſo much benefited thereby as the ſoils before deſcribed, which being more denſe, and tenacious, are therefore better adapted for the growth and nouriſhment of plants.

The qualities of theſe kinds of ſoils being directly oppoſite to thoſe of clay, it ought to be the chief ſtudy of every cultivator of light ſoils, to change them to a middle ſtate, between clay and ſand; or, in other words, to make them poſſeſs, to as great a degree as poſſible, the qualities of loam. Wherever this can be effected, they will be brought to a proper conſiſtence; and their principal defects, the want of coheſion, and a power of retaining water, counteracted.

By the ſame rule, and nearly in the ſame proportion, as ſand fertilizes clay lands, clay will remedy the imperfections of light, or ſandy ſoils*. Clay which contains little or no calcareous earth, is proved, by long experience, in Suffolk, Norfolk, Yorkſhire, and the County of Moray, to produce the moſt beneficial effects, when applied to ſandy ſoils. In Suſſex, Stafford, Cheſhire, the Iſle of Wight, Caermarthen, and many other diſtricts, marl has been ſucceſsfully applied; but in

* Dr. Fordyce ſays, that leſs clay will prove uſeful on ſandy ſoils, than ſand on clay ſoils. Elements of Agriculture, page 89.

in the counties of Norfolk, and Angus, or Forfarſhire, the moſt aſtoniſhing improvements have been effected on light ſoils, ſince the uſe of that ſort of manure has been introduced; inſomuch that lands which, thirty or forty years ago, did not rent for above two or three ſhillings the acre, now bring from eighteen to twenty-five ſhillings. Peat earth, or moſs, has alſo been ſtrongly recommended as a proper manure for ſand. The writer has had occaſion to ſee moſs uſed in large quantities in compoſts or mixens, for light tillage lands, in Moray, Nairn, &c. and moſs alone very ſucceſsfully applied, as a top-dreſſing, for graſs lands of the ſame deſcription in Perthſhire. It is impoſſible to determine what part of theſe mixens or compoſts above mentioned, had the moſt powerful effects on the ſoil; or whether the various ingredients of which they were compounded, might not all have tended to produce the beneficial effects which reſulted from the application; but in the latter caſe the paſture was improved in a manner ſo ſurpriſing, as to evince, that for light, ſandy, or gravelly ſoils, in a ſtate of paſturage, moſs ſpread liberally on the ſurface, is an excellent manure, and as ſuch may be ſafely recommended.

Moſſy Soil.—With reſpect to the origin of moſs*, many

* This kind of ſoil is called moor or peat earth in England, moſs in Scotland, and bog in Ireland.

many theories have been formed, and opinions advanced, which it would be improper here to detail. One circumſtance muſt have occurred to the obſervation of thoſe who have travelled through the northern counties of Scotland, namely, that in the bottoms of moſſes, whence peat had been cut, innumerable large roots of trees are to be ſeen, ſpread in all directions. As the ſtumps of theſe trees are now, when the moſs is taken off, at leaſt from two to three feet above what may be called the original ſurface ſoil, it ſeems reaſonable to infer, that woods or foreſts have, in a material degree, contributed to the formation of moſs.

The botanical writers rank moſs in the claſs of vegetables, and ſome have aſſerted that moſs is of two kinds: the one, that ſort of which peat is made, they conſider as vegetables in a living ſtate; the other, which has very little of the adheſive quality, they call the roots, and other parts of dead vegetables in an uncorrupted ſtate.

Moſs, in an agricultural view, is a black, moiſt, ſpongy earth, eaſily penetrable by water, of which it is capable of retaining a large quantity, and with which it does not readily part. This ſort of ſoil may be termed a dunghill, compoſed of rotten timber, graſs, and weeds, with frequently a mixture of ſand or mud, waſhed down from the adjacent high grounds by heavy falls of rain, or depoſited by the overflowing of rivers

rivers or waters. Moſs being for the moſt part overflowed, or ſwelled, like a ſponge with water, unleſs the ſuperfluous water is drained off, and ſuch manures applied as are moſt proper for reducing it to a ſtate of putrefaction, its vegetative powers muſt ever remain feeble and languid.

The manures moſt proper for moſs, are thoſe which effervefce to the greateſt degree with acids, as lime, marl, chalk, and ſhell or ſea ſand. Theſe, when applied, create a great fermentation, which tends to putrify the vegetables of which moſſy ſoils are chiefly compoſed; by which means, principally, theſe ſoils can be brought to nouriſh the plants either of grain or graſs.

The manures above mentioned have all been ſucceſsfully applied to moſſy ſoils, in various parts of Great Britain. Lime, in particular, has produced wonderful effects in rendering ſuch ſoils productive in Ayrſhire, as will be afterwards more fully explained.

We are informed by Virgil, that the ancients uſed to manure moſſy ſoils with ſand and gravel. That laying earth on moſs is a beneficial practice, has in many inſtances been proved by experience in modern times. In Stirlingſhire, a tract of moſs was a few years ago ſpread over with earth, by way of manure, and the field being allowed to remain in that ſtate for a year or two, it was covered with as rich a carpet of natural white clover, and other graſſes, as if it had been properly

cultivated, and ſown with graſs ſeeds, in the ordinary method.

Beſides theſe ſoils, of which particular notice has been taken, ſeveral others were mentioned as being common in Great Britain, and of all which there are great varieties; inſomuch that an attentive farmer muſt have diſcovered, that ſoils, like ſhades of colours, blend into each other till diſtinction becomes imperceptible. Any attempt, therefore, to characteriſe theſe varieties, would be, if not impracticable, at leaſt a tedious taſk; and when completed, with all the minuteneſs of which the ſubject is capable, could tend little to general information. After any deſcription of ſoils that can be given, it muſt be left to the perſon who intends renting a farm, to determine to which of theſe four great diviſions of ſoil it is neareſt allied, and to what degree it poſſeſſes the good or bad qualities of either.

CHAP.

CHAPTER XII.

Rotations of Cropping beſt adapted to the various Soils and Situations.

IT is a material branch of huſbandry, by a judicious rotation of crops, to keep land always in good condition, and at the ſame time draw out of it the greateſt poſſible profit.

The Romans generally fallowed their lands every ſecond year; a method ſtill practiſed in ſome parts of Normandy. Although Pliny points out the propriety of an alteration from this general practice, by obſerving that wheat may be ſowed after lupins, vetches, beans, or any other plant which has the quality of fertilizing the ſoil,* yet it does not appear that the practice became general among that people. The importance of introducing and eſtabliſhing proper rotations

* There is no place in Great Britain, that the practice of ſowing wheat and beans alternately, with now and then a fallow, inſtead of a crop of beans, is ſo general, or has been ſo long eſtabliſhed, as in the Iſle of Shepey in Kent.

tions of cropping, ſeems alſo to have been well underſtood by the Venetians: ſo long ago as the year 1566, Camillo Tarello, by order of the Senate of Venice, planned and preſented a mode of cropping to that aſſembly, which, conſidering the ſtate of agriculture at that period, muſt have been attended with conſequences no leſs advantageous to the public, than beneficial to thoſe concerned in huſbandry. It was to this effect: "Let the ploughing hitherto given to corn land, "divided into two portions, each of which be- "ing reſted every alternate year, receives four "ploughings in that year, be transferred to the "half of one of theſe portions, ſo that it be "ploughed eight times, including the ſeed "ploughing. I mean, that every farm in til- "lage be divided into four equal parts; and "that only one of theſe four parts, taking them "alternately, be ſowed with corn in any one "year after it has been ploughed eight times. "Two other parts ſhould be laid down to graſs; "and the fourth ſhould be fallowed a year, du- "ring which it ſhould receive the before men- "tioned number of ploughings. He therefore, "who has, for example, ten acres under corn, "ſhould for the future ſow but five, and ſo in "proportion for a larger or leſs extent; and all "the manure and labour beſtowed upon his "ten acres, ſhould be appropriated to the five "only: that is to ſay, he ſhould plough them

"eight

" eight times, unleſs the ſoil be extremely " light.*"

However paradoxical it may appear, it cannot be denied, that the practice of adhering to regular rotations of cropping, has hitherto been attended with effects more prejudicial than advantageous to Britiſh agriculture; as what Du Hamel obſerves in regard to the French farmers in general, may with too much propriety be applied to a majority of thoſe in Great Britain.—" They " change their crops, not upon any principle " dictated by reaſon, but merely becauſe it was " the cuſtom of their forefathers.†" Any perſon who reflects on the impropriety of keeping lands conſtantly in tillage, as is the practice in the open field pariſhes in England, although cultivated under regular rotations, or on the mode formerly ſo generally eſtabliſhed in Scotland, of dividing every farm into what was called infield and outfield, not to mention the abſurdity of permitting ſo great a proportion of the beſt lands in the incloſed pariſhes in England to remain for ever in graſs, muſt be ſatisfied, that ſuch modes of management are by no means calculated to make the ſoil produce the greateſt returns it is capable of yielding.

From the above obſervations, reſpecting what may be called the ancient modes of cropping in theſe

* Mem. Soci. de Berne, Tom. ii. par. iii. p. 681.

† Culture des Terres, Tom. vi. p. 34.

theſe kingdoms, it is not intended to draw any inferences, whereby the propriety of adopting regular and beneficial rotations of cropping can be called in queſtion.—The modes above mentioned, which will not be termed judicious in theſe enlightened days, originated in a great meaſure from the barbarous ſpirit of the times in which they were introduced; when ſecurity of property was little known, and may on that account be conſidered rather as the offspring of neceſſity than choice.

It is ſcarcely poſſible to adduce a more deciſive proof of the advantages reſulting from regular modes of cropping being generally eſtabliſhed on proper principles, than the improvements in agriculture that have recently taken place over a great part of Scotland. That Scotchman muſt be very little acquainted with the agricultural hiſtory of his own country, who does not know that, to the introduction of approved modes of cropping, is in a great meaſure owing the improvements which have made ſuch amazing progreſs in that kingdom, within theſe thirty years; and that to the ſame cauſe, more than to any other, is to be attributed the ſtill progreſſive ſtate of theſe improvements.

The eſtabliſhing ſome regular rotation, in which a farm ſhall be cropped during the currency of a leaſe, is not only very proper, but muſt prove greatly advantageous to both proprietor

prietor and tenant; nor does it militate againſt this aſſertion, that many modes of cropping are adopted, which in their conſequences operate againſt the intereſts of both, as well as againſt that of the community at large.

When a proprietor, who has with much labour and expence improved a farm, and put it in a high ſtate of cultivation, feels himſelf diſpoſed to let it for a term of years, it is certainly for his intereſt, and cannot with propriety be objected to on the part of the tenant, that the leaſe ſhould contain ſuch rules and regulations, regarding the future management, as to prevent the occupier, were he ſo inclined, to run out and exhauſt the lands. By judicious reſtrictions in this reſpect, the proprietor ſecures to himſelf the certainty of reſuming poſſeſſion of the farm, at the expiry of the leaſe, in as good a ſtate of cultivation, and under as beneficial a rotation of cropping, as at the commencement, when the improvement of the farm was firſt completed.

When a proprietor ſtipulates for a moderate rent, in conſideration of the exhauſted ſtate of the lands, and the expence which he knows the tenant muſt be ſubjected to on that account, it is equally proper on the part of the landlord, to include ſuch covenants in the leaſe, as are likely not only to ſecure the ſpeedy, but alſo the permanent improvement of the farm. If the tenants in ſuch caſes are not bound to purſue certain methods

methods of culture, during the whole period of their occupancy, the proprietors can have no well founded reaſon to expect, that the objects they had in view will ultimately be attainable. The tenants, if left at liberty, will, during the few laſt years of their poſſeſſion, ſo crop the lands, as to turn the improvements effected in the former years entirely to their own advantage. Tenants in general, even when not reſtricted to any particular modes of cropping, when they acquire a permanent intereſt in a farm, in virtue of a leaſe, begin with improving the lands; and when no unforeſeen misfortune happens, purſue ſuch courſes of huſbandry, till within a few years of the end of the leaſe, as are beſt calculated to keep the farm in proper order. This they do, becauſe they know it is for their intereſt. For the ſame reaſon, towards the end of the leaſe, they adopt a very different line of conduct; frequently over cropping the lands in ſuch a manner, as they conceive will turn out moſt profitable, without ever reflecting on the injury which the proprietors thereby ſuſtain. There are alſo many inſtances, where tenants, from the preſſure of their circumſtances (when under no regulations or reſtrictions in regard to cropping), are induced to prefer immediate gain to future proſpects; and to adopt ſuch modes of culture, as prove ultimately deſtructive to themſelves, and to the farms which they occupy.

The

The nation at large derives benefit from the general introduction of better modes of huſbandry. But the advantages which reſult from adopting regular and proper modes of cropping, are not confined to the proprietors, and the public at large; for farmers, as individuals, are gainers by being limited to certain methods of culture.

On every farm, where the tenants are bound to adhere to particular rotations of cropping, the labour is regular, and the ſame number of ſervants and horſes are ſufficient, during the whole leaſe. Where they are under no controul, it frequently happens, that they have either too much or too little work to perform: guided in their conduct by miſtaken ſelf-intereſted views, they ſome years cultivate the greateſt part of their farms for grain; in others, graſs huſbandry becomes their chief object; and this will ever be generally the caſe, where there is no fixed determinate rule by which to act. The profit on farms ſo managed, it will be readily allowed, muſt be more precarious, than when one regular ſyſtem is conſtantly adhered to, while the expence muſt to a certainty be greatly augmented.

As the mode of cropping fixed upon is, for the moſt part, ſuch as meets the approbation of the tenant, as well as the proprietor, and is founded on a thorough knowledge of the nature

of the ſoil, and of the other particulars neceſſary to be attended to in theſe arrangements, there can be no doubt that the crops, during the continuance of a leaſe, will be upon the whole better, and more valuable to the tenant; being procured at leſs expence of management, than if he were permitted to over-crop the farm at his pleaſure, and to avail himſelf of that permiſſion occaſionally, in hopes of a temporary great advantage, to undo in a ſhort period that which had coſt him much time, labour, and expence to effect.

A farmer who is bound to the regular cultivation of his farm, has in general a greater variety of produce to carry to market, and that produce in almoſt every inſtance ſuperior in quality to him, who cultivates his farm under no reſtriction. Theſe are obviouſly great advantages. Some articles, it is true, may ſell low in particular years; yet others in general bring ſo much higher prices, as to leave a regular annual profit; and from having a variety of articles to diſpoſe of, the inconvenience which the farmer muſt be frequently ſubjected to, who has only to truſt to the ſale of one or two commodities, will be ſeldom or ever felt. Should any one of them be unſaleable for a time, it is of little moment, compared to the diſagreeable ſituation in which he would be placed, if his whole dependence for the payment of his rent, and all other neceſſary expences,

reſted

reſted on the ſale of one or two articles, for which, at the period he muſt carry them to market, there was no demand.

It has been already hinted, that the produce of a farm in a regular ſtate of cultivation, is ſuperior in quality to that of a farm which has been over-cropped and exhauſted; therefore, as every kind of farm-produce is ſold at prices according to its quality, and as that is aſcertained by compariſon, it follows of courſe, that it is advantageous to a farmer to adopt ſuch modes of cultivation, and rotation of crops, as experience has proved, or an intimate knowledge of the nature of the ſoil, and other circumſtances, ſuggeſts to be beſt for improving the quality of the grain and graſs.

The propriety of ſtipulating, that tenants ſhall crop their farms, according to particular rules, has been ſtrongly objected to on the principle, that they are thereby prevented from turning their attention towards finding out new modes, whereby the lands would be further improved, and their profits at the ſame time rendered more conſiderable. It has alſo been urged as an abſurd meaſure, to ſhakle a ſpirited, active, intelligent farmer, in ſuch a manner, as to compel him to proceed in the ſame beaten tract for nineteen or twenty-one years; during which period, many new and important diſcoveries may have been made, of which he cannot avail himſelf. For

theſe

theſe reaſons, it is maintained, that improvements in agriculture muſt go on much more ſlowly, than if farmers of this deſcription were at liberty to alter the order of their crops, and to introduce other modes, whenever they judged ſuch alterations beneficial. There is no general rule without exceptions. Farmers there are in Great Britain, and the number is by no means inconſiderable, who, convinced of the propriety of adopting judicious modes of cropping, would adopt ſuch as could not fail to inſure the permanent improvement of their farms, although laid under no reſtrictions of any kind. The majority of Britiſh farmers are, however, as ſtated above, of another deſcription. They, from ignorance, or a deſire to gain a temporary advantage to themſelves, at the expence of a greater future good to the proprietors, and the public, would be very much diſpoſed, if they had it in their power, to over-crop and run out their farms, eſpecially towards the cloſe of a leaſe, in ſuch a manner as to render it both tedious and expenſive to bring them again into an improved ſtate of cultivation. Others again would go on with the old-faſhioned modes of cropping, during the whole leaſe, however improper they might be, or oppoſite to thoſe, which, in order to promote their own intereſts, or the improvement of the country, they ought to adopt.

It

It is alſo maintained, that on ſome occaſions, it is impracticable for tenants to adhere rigidly to particular modes of cropping. This, it is preſumed, may be admitted, without departing from the general principle. Unfavourable ſeaſons, it is true, now and then intervene, which bid defiance to the utmoſt exertions of the moſt active to overcome. Sometimes, owing to a long tract of dry weather in ſummer, a crop of turnips, after a field has been prepared at much labour and expence, miſs-gives. At other times, heavy and long continued falls of rain in autumn prevent the ſowing of a field with wheat. While not unfrequently, either from a failure of the ſeed, or owing to ſome other cauſe, a crop of artificial graſs fails. In either of theſe caſes, or in others that might be mentioned, the tenant muſt neceſſarily deviate from the ſtrict letter of his agreement, to an adherence to which he is probably bound by ſtrong and explicit covenants, or he muſt ſuſtain a conſiderable loſs. On ſuch occaſions, it is highly fair and reaſonable, that the tenant ſhould be indulged with the liberty of making a temporary deviation from the eſtabliſhed order of cropping, ſo as to enable him to make the moſt of the untoward ſituation, in which, from any of theſe unforſeen events, he may be placed. At the ſame time, it certainly cannot be conſidered unfair, or unreaſonable, that the landlord, who has a more

more permanent intereſt in the ſoil, ſhould have the power of determining, to what extent the deviation ſhould take place, and the means by which the farm can ſooneſt be put again into the eſtabliſhed order of cropping. This power, in all ſuch caſes, muſt be lodged with one or other of the parties. That the landlord has the beſt title to exerciſe it, will, it is preſumed, be generally acknowledged.

There are few proprietors in theſe kingdoms, who do not conſider the introduction of better modes of cropping as an object of importance; and it is hoped, the number is daily decreaſing, who are ſo inattentive to their own intereſt, or the advancement of agriculture, as not to grant their tenants permiſſion at any time to deviate from the rules of cropping preſcribed in their leaſes, provided others are ſubſtituted in their place, an adherence to which may reaſonably be expected, to inſure more abundant returns; while the farm would, at the ſame time, be advancing to a ſtill higher degree of improvement. On any other terms, it would be unreaſonable in a tenant to requeſt an alteration; nor ſhould it be granted by a proprietor, who regards the introduction of improved modes of huſbandry on his eſtate as of more importance than any trifling additional rent that could be procured, by granting the tenant improper liberties in this reſpect.

From

From the foregoing obſervations, it is hoped the propriety of ſubjecting tenants of all deſcriptions to certain regulations, in regard to modes of cropping, will appear evident. Without a general attention on the part of the proprietors to that neceſſary precaution, improvements in agriculture will not continue to advance, notwithſtanding the exertions of the Legiſlature by the National Board of Agriculture. Theſe may indeed promote ſuch meaſures as will in time remove thoſe principal obſtacles which at preſent obſtruct that progreſs towards perfection, ſo much to be wiſhed for, and in which all ranks are ſo deeply intereſted: but unleſs proper ſyſtems of cropping are adopted, and rigidly adhered to, even theſe exertions, added to the general ſpirit for improvements which now prevails, may not long be ſufficient to prevent that moſt uſeful art from taking a retrograde motion.

Although regular courſes of cropping muſt in general be conſidered as beneficial, yet it by no means follows, that all the courſes now adopted, and which are conſidered improvements on the ancient ſyſtems, are to an equal degree advantageous. It is the duty as well as the intereſt of every farmer to conſider, with the moſt minute attention, before taking a farm, whether the mode of cropping propoſed to be adopted, be, in every point of view, the beſt that can be deviſed

devised for that particular tract of land which he propoſes to farm. The rent of a farm, where the tenant is bound to a particular mode of cropping, ought always to be regulated in ſome degree by the nature of the arrangement in this reſpect. Some modes of cropping are better adapted for keeping the farm in a progreſſive ſtate of improvement, than for forcing it to produce the greateſt returns. Others again are arranged on ſuch juſt principles, that while abundant crops are reaped, the ſoil is not thereby exhauſted; and in proportion as the modes of cropping approaches towards this, which may be conſidered the ſtandard of perfection, ſo ſhould the rent, every other circumſtance being alike, advance or decreaſe. An intelligent farmer will always offer a rent, in proportion to the extent of liberty granted him in regard to the mode in which the farm is to be cropped; and for a farm, where no regulations are preſcribed, conſiderably more than for one where he is under reſtrictions of any kind. This he is warranted to do; becauſe, from his ſuperior knowledge, he is able in the one caſe to force more valuable crops from the farm than in the other he is able to do, while his good ſenſe, and a proper regard to his own intereſt, prevent him from exhauſting the farm to ſuch a degree as that he ſhould become ultimately a loſer thereby; which, under the ma-

nagement of ignorant farmers, almoſt always is the caſe on ſuch occaſions.

Conſidering the inconveniencies, hazards, and loſſes, which farmers, from the mixed nature of their buſineſs, are ſubjected to, the arrangement in regard to the mode of cropping, compared to the rent demanded, ought always to be in their favour. When that is not the caſe, no proviſion is made for increaſed expence of cultivation, indifferent crops, bad markets, and many other vexatious circumſtances, which frequently occur, and affect not only the comfort, but the proſperity of the huſbandman.

There are ſeveral circumſtances which both landlords and tenants ought to conſider when fixing rotations of cropping. It is impoſſible to determine with propriety what mode of cropping is beſt adapted to a farm, without firſt aſcertaining the nature and quality of the ſoil, the temperature of the climate, and the ſituation in regard to manure, and to markets, for the ſale of the ſurplus produced.

The ſtrong ſoils in the hundreds of Eſſex, the fens of Lincolnſhire, and the carſes of Gowrie and Falkirk, are, for example, juſtly celebrated for the quantity and quality of wheat and oats which they produce. It would, therefore, be abſurd in the extreme to exclude wheat and oats from the courſe of crops in theſe diſtricts,

and to ſubſtitute turnips and barley in their place.

The light ſoil of Norfolk is famed for producing great crops of turnips, and barley of the very beſt quality, it would therefore be contrary to reaſon and common ſenſe to prohibit the farmers of that county from cultivating theſe crops, and conſtrain them to ſow wheat and oats.

Owing to the lateneſs and moiſtneſs of the climates in the north of Scotland, the harveſts are on an average three weeks behind thoſe in Hertford, and ſome of the adjoining counties. To fix a rotation of cropping for theſe diſtricts, whereby the farmer's chief dependence was to be placed on crops of wheat, which in that country ſeldom come to perfect maturity, even in the moſt ſheltered ſpots, would be an act of impropriety, for which there could be no excuſe.

The weſtern coaſt of Great Britain, in conſequence of its contiguity to the Atlantic Ocean, is expoſed to frequent, and ſometimes long continued tracts of rainy weather, whereby the harveſts are rendered very precarious. The eaſtern coaſt, on the other hand, from its vicinity to the great continent of Europe, being leſs ſubject to rain, the harveſts are earlier, and the crops ſeldom ſuſtain any material damage. For theſe ſubſtantial reaſons, the cultivation of grain is more general on the eaſtern ſide of the iſland,

while the greateſt proportion, even of the moſt fertile lands, on the weſtern coaſt, is devoted to paſturage. Therefore a ſimilar rotation for both would be extremely injudicious. The ſituation of a farm, in regard to the eaſe or difficulty of procuring manure, alſo merits attention. If a rotation of cropping be adopted, whereby three-fourths or five-ſixths of a farm are to be conſtantly under cultivation, and the farmer deprived, on account of diſtance, from procuring lime, chalk, marl, *&c.* it is almoſt impoſſible the dung that can be procured from the farm-yard, will be ſufficient to keep the lands in a progreſſive ſtate of improvement, unleſs, according to Jethro Tull's ſyſtem, it ſhall be found that cultivation is all in all. It is therefore highly neceſſary that attention be paid to the eaſe or difficulty of procuring manure in regulating the proportion of a farm that is to be conſtantly in tillage.

The ſituation of a farm, in regard to markets for the ſale of the ſuperabundant produce, ought alſo to be an important conſideration with a farmer, when determining on the moſt proper mode of managing a farm, which he is about to rent. In a country thinly inhabited, and remote from populous towns, it would be improper to ſtipulate that the lands ſhould be chiefly in cultivation; becauſe, ſending grain twenty or thirty miles to market by land-carriage, is ſo expenſive,

as

as greatly to reduce the profits of the farmer; and at the ſame time, occupies ſo much the time of his ſervants and horſes, as materially to retard the operations on the farm. In the interior parts of the counties of Aberdeen, Banff, &c. by much the greateſt proportion of the improved lands is kept in cultivation, and large quantities of grain and meal are annually ſent at much labour and expence to the towns on the ſea-coaſt. Were the lands kept more in graſs, the ſuperabundant produce of the country, *viz.* black cattle, horſes, and ſheep, would either be purchaſed by people who would come from other parts for the purpoſe, or they might be eaſily ſent to diſtant markets, without much trouble or expence.

Theſe, and many other particulars, although of leſs moment than thoſe already mentioned, require the ſerious conſideration both of proprietor and tenant, when arranging the mode in which a farm can be cropped to the greateſt advantage. For much of the farmer's ſucceſs on the one hand, and of the real and permanent improvement of the farm on the other, depend on adopting a proper and advantageous mode of cropping, which is not likely to be the caſe, without paying due regard to various circumſtances, which ought on theſe occaſions to fall under review.

The predominant ſoils of Great Britain have already

already been claſſed, and treated of under four ſeparate heads or diviſions, namely, clay, loam, ſand or gravel, and moſs. To ſpecify all the rotations of cropping, conſidered in different diſtricts, as beſt ſuited to the ſame kind of ſoil, would be an endleſs work. Even common exertions in the ordinary practice of the various branches of huſbandry, ſpread into ſuch endleſs variations, that to ſpecify all the methods purſued in particular diſtricts by individuals, would increaſe this work beyond all reaſonable bounds.

The rotations of cropping, which in ſome particular counties are conſidered the moſt proper for theſe various ſoils, will be found ſtated below; and care has been taken to ſtate ſuch only as are in ſome degree different from each other.

ROTATIONS of cropping for CLAY and STRONG LOAM.

Four courſe ſhift, as adopted in Kent.	Five-courſe ſhift, as adopted in Suffolk.	Six-courſe ſhift, as adopted in Northumberland.	Six-courſe ſhift, as adopted in the Carſe of Gowrie.
1. Fallow,	1. Fallow,	1. Oats,	1. Fallow,
2. Wheat,	2. Wheat,	2. Fallow,	2. Wheat,
3. Clover,	3. Barley,	3. Wheat,	3. Peaſe or beans,
4. Oats or wheat.	4. Clover,	4. Clover,	4. Barley,
	5. Wheat,	5. Wheat,	5. Clover,
		6. Fallow.	6. Oats.

Intelligent

Intelligent farmers in every part of Great Britain, are now in general ſatisfied, from experience of the impropriety of taking two or three culmiferous or white-corn crops, without either a complete ſummer fallow, or ſome ſort of green crop intervening. In this reſpect, all the courſes of cropping above ſtated, except Suffolk, are equally correct. In others they all differ materially. By the practice in Kent, it appears wheat is frequently ſown twice in four years; in Suffolk, twice in five years; in Northumberland, every third year; but in the Carſe of Gowrie, only once in ſix years.

Wheat is well known to be not only the moſt valuable kind of grain, but alſo in general one of the leaſt precarious crops that can be cultivated on ſoils of the above deſcription. For theſe reaſons, on that crop, the cultivators of ſuch ſoils, reſt their chief dependence for payment of their rents. The more frequently, therefore, that wheat can, with propriety, be introduced in a courſe of cropping, the higher rent the farmer will be enabled to pay his landlord. This reaſoning, however, does not ſeem always to hold in practice. There are few parts of Great Britain, where the rent of farms is higher, or the expence of cultivation greater, except in the ſingle article of the maintenance of

of farm-ſervants, than in the Carſe of Gowrie*; yet, when the moſt approved mode of cropping in that diſtrict is compared with others above ſtated, it will be found the leaſt in favour of the tenant, on account of the ſmall proportion of the farm that is yearly under wheat. Some of the proprietors in that diſtrict, who receive the greateſt rents, ſeem indeed ſenſible, that unleſs a greater proportion of the farms is allowed to be annually in wheat, it is impoſſible that the farmers can continue to pay ſuch high rents. They have accordingly in ſome caſes covenanted, that one fourth of the farm ſhall be yearly under wheat,—a mode of cropping, which, it is preſumed, will in a few years become general.

Where lime, chalk, or any other kind of manure can be procured in abundance, and at a reaſonable rate, the rotation adopted in Kent, appears to be that by which the greateſt poſſible rent can be paid, as wheat, oats, and clover, delight in a ſtrong ſoil; whereas barley thrives beſt in light friable loams, or gravel. Peaſe and bean crops are always precarious, and will be found on an average, of any eight or ten ſucceſſive years, to do little more than repay the ordinary expence of ſeed and cultivation.

Rotations

* There are many conſiderable farms rented from forty to fifty ſhillings the Engliſh ſtatute acre.

Rotations of Cropping for Light Loamy Soils.

Four courſe ſhift, as adopted in Suffolk.	Five courſe ſhift, as adopted in Suſſex,	Six courſe ſhift, as adopted in Berkſhire.	Seven courſe ſhift, as adopted in Oxfordſhire.
1. Turnips,	1. Fallow,	1. Wheat,	1. Fallow,
2. Barley,	2. Wheat,	2. Barley,	2. Wheat,
3. Clover,	3. Oats,	3. Turnips,	3. Barley,
4. Wheat,	4. Clover,	4. Oats,	4. Turnips,
	5. Oats, or Wheat,	5. Graſs,	5. Barley,
		6. Graſs,	6. Clover,
			7. Oats,

Whoever has made courſes of cropping an object of attention, will at once determine in favour of that practiſed in Suffolk*. On ſuch ſoils, as turnips and wheat can be cultivated to advantage, it is unqueſtionably the beſt, and moſt unexceptionable ſyſtem that ever was introduced, eſpecially if the turnips are ſown in drills, and properly horſe and hand-hoed, as is the general practice in the north of England and ſouth of Scotland; by which means, the land is reduced to as fine a tilth, and made as free of weeds, as if it had undergone a complete ſummer fallow.

The ſyſtem adopted in Suſſex is extremely reprehenſible, in ſo far as oats are made to ſucceed wheat. Theſe are both ſevere and exhauſting

* This mode of cropping is ſimilar to that adopted very generally in the highly cultivated country of Flanders.

hauſting crops, and muſt be greatly more ſo, when they follow each other without either a fallow, or ſome kind of meliorating crop coming between. In ſeveral of the more improved counties of Scotland, the tenants by their leaſes, are debarred from ſowing wheat after wheat, wheat after oats, or oats after wheat; a hint which may be ſerviceable to the landholders and farmers of Suſſex.

The Berkſhire mode of cropping above mentioned, which ſeems to have been learned at the Norfolk ſchool, is much ſuperior either to that of Suſſex or Oxford; as in both theſe, fallow conſtitutes a part of the ſyſtem, which in ſoils proper for turnips ſhould never be introduced, except on extraordinary occaſions.

Some farmers in Berkſhire practiſe a mode of cropping very different from the one ſtated above, and which ought certainly to be exploded from every diſtrict in Great Britain. Wheat, barley and oats, are made to ſucceed each other; than which a more ruinous method can ſcarcely be conceived, unleſs that of oats, oats, oats in ſucceſſion, as long as the crops will pay for ſeed and labour; a ſyſtem of cropping ſtill too prevalent in Lancaſhire, Weſtmoreland, Cumberland, and ſeveral of the weſtern and northern counties of Scotland. This ſyſtem evinces in the cleareſt manner, what little attention the proprietors of theſe diſtricts have hitherto beſtowed towards

promoting their own real intereſts, or the proſperity of that community of which they are members *.

Rotations of Cropping for Light, Sandy, or Gravelly Soils.

Four courſe ſhift, as adopted in Kent.	Five courſe ſhift, as adopted in Wiltſhire,	Six courſe ſhift, as adopted in Oxford.	Six courſe ſhift, as adopted in Norfolk.
1. Turnips,	1. Fallow,	1. Turnips,	1. Wheat,
2. Oats,	2. Wheat,	2. Barley,	2. Barley,
3. Clover,	3. Turnips,	3. Clover,	3. Turnips,
4. Wheat.	4. Barley,	4. Clover,	4. Oats or Barley,
	5. Clover.	5. Wheat,	5. Clover,
		6. Oats.	6. Clover.

The Oxfordſhire courſe of cropping merits cenſure equally with that of Suſſex formerly mentioned; and for the ſame reaſon, oats being made to ſucceed wheat, which, in the richeſt lands, muſt be conſidered as ſevere cropping, but is particularly ſo in light, chalky, or gravelly ſoils. Were that rotation confined to five diviſions, the oats excluded, and the ſecond year's clover-ley broken up about mid-ſummer, as a preparation for wheat, it would be greatly in favour of the proprietors, and highly advantageous to the occupiers.

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* See Scotch leaſe, vol. i. page 416.

The rotation on the light lands in Wiltſhire, is inferior to that adopted in Norfolk and Kent. By the Wiltſhire mode of management, one-fifth part of the farm is yearly in fallow, which is unneceſſary, or rather improper, when the ſoil is of a light nature, as the farmer is ſubjected to a conſiderable expence in cultivation, without receiving any return.

Whether the method of cropping adopted in Norfolk, which has been long eſteemed, (conſidering the general inferiority of ſoil) the beſt cultivated, and the moſt highly improved county in the iſland, or that in Kent, as ſtated above, is preferable, appears ſomewhat doubtful. Suppoſe two farms, each containing ſixty acres. By adhering to the rotations above mentioned, there would be thirty acres on each farm yearly under crops of grain. The Kentiſh farmer would have five acres of more turnips, and the Norfolk farmer five acres of more graſs, while the number of acres to be annually ploughed would be nearly the ſame; and of courſe, there would be no difference in the expence of cultivation. Both theſe rotations of cropping, however, are ſuch, as to merit general approbation, and the particular attention of thoſe who are engaged in the cultivation of ſuch ſoils.

Rotations

Rotation of Cropping when nearly one half of the farms are in graſs, or what in England are called convertable lands.

Six courſe ſhift, as adopted in Berwickſhire.	Seven courſe ſhift, as adopted in Warwickſhire.	Seven courſe ſhift, as adopted in Forfarſhire.	Eight courſe ſhift, as adopted in Cheſhire.
1. Oats,	1. Fallow,	1. Oats,	1. Oats,
2. Fallow or Turnips,	2. Wheat,	2. Barley,	2. Oats,
3. Wheat or Barley,	3. Beans,	3. Turnips,	3. Turnips,
4. Graſs,	4. Barley,	4. Barley,	4. Barley,
5. Ditto,	5. Oats,	5. Graſs,	5. Graſs,
6. Ditto.	6. Graſs,	6. Ditto,	6. Ditto,
	7. Ditto.	7. Ditto.	7. Ditto,
			8. Ditto.

It has been remarked in a former part of this work, that a conſiderable portion of the lands in England is kept conſtantly in meadow or paſturage; whereas in Scotland, there are ſcarcely any old graſs-lands, except around the proprietors houſes. In the latter kingdom, the moſt approved ſyſtem of management hitherto eſtabliſhed, except on ſuch ſoils as that of the Carſes of Gowrie and Falkirk, where the lands cannot be paſtured to advantage, is to have about one half of the farm in tillage, and the other half in graſs, which, all circumſtances conſidered, may be pronounced ſuperior to any other mode of cropping generally practiſed in the iſland.

In regard to the rotations laſt mentioned, that of Cheſhire is the worſt, as including two crops of oats running. This mode of ſowing oats after oats, ought never to be permitted on any ſoil, however fertile, as it is found in practice, that crops of oats impoveriſh the land, and encourage weeds more than any others; and on that account, a crop of turnips after a ſecond crop of oats, muſt be indeed precarious and uncertain.

Breaking up land from graſs by a fallow, as a preparation for ſowing wheat, ſtated as the mode of management in Warwickſhire, ſeems very extraordinary; and certainly, if a complete ſummer-fallow is uſually given, extremely objectionable. Were the land broken up for a crop of oats, and then fallow for wheat, in the manner ſometimes practiſed in Berwickſhire, it would be a very unexceptionable mode of cultivating all ſtrong fertile loams, ſuch as are better adapted to wheat and bean-huſbandry, than that of barley and turnips.

Barley ſucceeding oats, as is the common practice in Forfarſhire, to thoſe who are in the habit of cultivating white and green crops alternately, may at firſt view appear improper; but as the land is recently broken up from three year-old graſs, and receives three or four ploughings it is in ordinary ſeaſons in excellent condition for receiving the barley-ſeed. By the rotation of cropping adopted in Forfarſhire, the whole

whole farm is always uſefully and profitably employed; hence it is clear, that the arrangement is made on correct principles, and ſuch as muſt conduce to the intereſt both of landlord and tenant. For light friable ſoils like theſe, moſt prevalent in that diſtrict, perhaps no mode of cropping could be ſuggeſted, that would be found to anſwer ſo well. In regard alſo to the ſituation of that country, either for procuring manure, or for the ſale of the ſuperabundant produce, this ſyſtem is well adapted.

Many more ſchemes of cropping might have been mentioned, but it was deemed unneceſſary. At a period like the preſent, when the beſt means of promoting improvements in agriculture, form the principal topics of converſation in almoſt every company; and when men of ſcience have turned their attention to the advancement of that art, various are the modes of cropping that will be ſuggeſted; and in proportion as the ſtudy of agriculture becomes more general among people of that deſcription, the order in which one crop ſhould ſucceed another, or the ſyſtems of management which are judged moſt proper for the different ſoils, will diverge into ſtill more numerous variations.

Theſe rotations above mentioned, have been ſtated, for ſundry reaſons; ſome of them with a view of conveying an idea of what is conſidered

ſidered beſt for particular ſoils*; ſome, as being moſt advantageous when the cultivation of grain is the principal object; others, when mixed huſbandry, or alternate grain and graſs-crops are conſidered as moſt beneficial; and others again, rather to ſhew their imperfections, than to recommend them to general attention.

From the preliminary obſervations, as well as from the rotations of cropping ſtated, it muſt appear ſufficiently clear, that no ſpecific rules can be laid down for regulating the conduct of individuals in this very important and eſſential point. A judicious rotation of cropping can only be fixed with propriety, after a due conſideration of ſoil, climate, ſituation, and other circumſtances. The farmer who adopts a mode of cropping after a deliberate and minute inveſtigation of theſe, will, ninety-nine times out of a hundred, prove ſucceſsful; while he whoſe conduct in this reſpect is regulated by no fixed principles, or who makes an improper choice, will as certainly be diſappointed, even although he ſhould ſtrictly adhere to a rotation of cropping, the moſt proper, under other circumſtances, that genius could deviſe.

It

* The manner of cropping and managing moſs-lands, is purpoſely omitted here, as it is intended to ſpecify particularly the beſt mode of cultivating that kind of ſoil, when treating of the means by which waſte lands may be moſt effectually improved.

It may not be improper, to close this chapter with one general observation, which will be found in practice, rarely to misgive; namely, that if a farmer be debarred by his lease from taking two white-corn crops running, and precluded from sowing oats in the same field above once in six or seven years, it is scarcely possible, that, with an ordinary supply of manure, and the least attention to the proper methods of cultivation, he can run out or exhaust his farm.

CHAP-

CHAPTER XIII.

Manures moſt commonly uſed in Great Britain—their Natures, Qualities, and Effects.

EVERY ſubſtance which promotes the growth of plants, is denominated a manure; and by the proper application thereof, ſoils are enriched and fertilized, ſo as to produce a greater increaſe of the different ſpecies of crops, and of a ſuperior quality. Manures ſerve likewiſe to repair the decay of exhauſted lands, or to cure their various defects.

Although Mr Tull be almoſt the only perſon who has boldly aſſerted, that tillage alone will produce every effect that can be expected from the application of manures, yet it muſt be acknowledged, that we are in a great meaſure ignorant of the various ways in which manures operate.

"Manures," Mr Dickſon obſerves, "operate "in all the different ways by which vegetation "is promoted: firſt, by communicating to the "ſoil

" ſoil with which they are mixed, the vegetable
" food which they contain; ſecondly, by com-
" municating to it a power of attracting the food
" in greater plenty from the air; thirdly, by en-
" larging the vegetable paſture which it con-
" tains; and laſtly, by diſſolving the vegetable
" food which it is already poſſeſſed of, and fit-
" ting it for entering the roots of plants.* "

Thus every philoſophical writer on that ſubject erects ſome plauſible ſyſtem, which he ſupports with all his ingenuity; and hence it happens that, in theory, writers of the greateſt ſagacity and penetration frequently differ, and enter into controverſies, which in general tend rather to obſcure than to clear up the points under diſcuſſion; whereas in practice, ſenſible and intelligent farmers will be found, for the moſt part, to agree, if the proper allowance be made for varieties in ſoil, climate, and ſituation.

The ſubject of manures, it will be granted by all, merits equally the attention of the theoretical and practical farmer, and ought to be conſidered by both as of the greateſt importance; for on a thorough knowledge of it depends, in no ſmall degree, the further extenſion of agricultural improvements. Their reſearches will no doubt have different objects in view, but they are objects well worthy the attention of each. The former will be anxious to aſcertain the principles upon

* Dickſon's Agriculture, Vol. i.

upon which vegetation depends, ſo as to diſtinguiſh the qualities of the various kinds of manures, and to apply them with effect to the ſoils for which he knows they are beſt adapted. The latter, loſing ſight of cauſes and effects, will turn his attention to procure the moſt accurate information concerning the practice in other diſtricts; a thorough knowledge of which, will, in his opinion, beſt enable him to improve his own.

As the writer pretends to no knowledge of chymiſtry, and has no intention of endeavouring to combine that ſcience with agriculture, his philoſophical readers will not probably reap much information or entertainment from the following treatiſe on manures, it being confined to thoſe particulars that are more eſpecially calculated for the information of the practical farmer.

In treating of manures, the following arrangement has been made choice of, as being both clear and comprehenſive.

Section I. Mineral or foſſil ſubſtances.

Section II. Vegetable Subſtances.

Section III. Animal Manures.

Section IV. Compoſts or mixins.

SEC-

SECTION I.

Mineral or Foſſil Subſtances.

THERE is no mineral or foſſil manure ſo generally uſed in Great Britain as lime, nor one from the uſe of which ſo much benefit has been derived. The luxuriant crops that have been produced in conſequence of the application of lime, even in ſoils comparatively of little value, have been really aſtoniſhing; and evince, in the cleareſt manner, its ſuperiority to all other artificial manures. A deſcription of its nature and qualities ſhall therefore occupy the firſt place.

Lime.—Lime is a ſoft, friable ſubſtance, obtained by calcining or burning ſtone, marble, flint, chalk, coral, ſea-ſhells, &c. But the ſort of lime here to be taken notice of, is that obtained by burning ſtone.

When, or by whom, lime was firſt introduced as a manure, is extremely uncertain. From the directions given by Cato for building a lime-kiln, it is evident that lime was well known to the Romans. Palladius alſo gives an account of the different kinds of ſtone that were burned into lime in his day. "We make lime," ſays that author, "of a hard white ſtone; or tibur-

"tine;

" tine; or dove-coloured river ſtone; or a red, " or porous ſtone; or, laſtly, of marble." But neither of theſe writers make any mention of lime being uſed as manure.

The moſt certain method to aſcertain whether any ſort of ſtone is capable of being reduced to lime by calcining, is as follows: Drop upon it a little oil of vitriol, aquafortis, or ſpirit of ſea-ſalt; all ſtones on which theſe, or any other ſtrong acid efferveſces, or riſes in bubbles, will burn to lime; and the ſtronger the efferveſcence which any of theſe acids produces, the better will be the quality of the lime.

Various are the forms in which kilns are conſtructed for burning lime. It would anſwer no purpoſe to give a minute deſcription of each; but as there are ſeveral ſorts of fuel uſed in different parts of theſe kingdoms, for burning limeſtone, it may be proper to take notice of ſuch kilns as are conſidered of the beſt conſtruction for being worked with theſe various ſorts of fuel; as coal, furze, and peat.

Along the banks of the frith of Forth, and on the eaſt coaſt of the counties of Northumberland and Durham, as well as in ſeveral other places where coal and limeſtone abound, and whence lime to a very large extent is annually exported, they uſe what are ſometimes called perpetual kilns, but which are more generally known by the name of draw-kilns.

Theſe,

Theſe, as all lime-kilns ought to be, are ſituated by the ſide of a riſing bank, or ſheltered by an artificial mound of earth. They are built either of ſtone or brick; but the latter, as being better adapted to ſtand exceſſive heat, is conſidered preferable. The outſide form is ſometimes cylindrical, but more generally ſquare. The inſide ſhould be formed in the ſhape of a hogſhead, or an egg, opened a little at both ends, and ſet on the ſmalleſt end; being ſmall in circumference at the bottom, gradually wider towards the middle, and then contracting again towards the top. In kilns conſtructed in this way, fewer coals are neceſſary, in conſequence of the great degree of reverberation which is created, beyond what takes place in kilns, formed in the ſhape of a ſugar-loaf reverſed. Near the bottom, two or more apertures are made; theſe are ſmall at the inſide of the kiln, but are ſloped wider, both at the ſides and the top, as they extend towards the outſide of the building. The uſes of theſe apertures are, for admitting the air neceſſary for ſupplying the fire, and alſo for permitting the labourers to approach with a drag and ſhovel, to draw out the calcined lime. From the bottom of the kiln within, in ſome caſes, a ſmall building, called a horſe, is raiſed, in the form of a wedge; and ſo conſtructed, as to accelerate the operation of drawing out the burned limeſtone, by forcing it to fall into the apertures

above mentioned. In other kilns of this kind, in place of this building, there is an iron grate near the bottom, which comes close to the inside wall, except at the apertures where the lime is drawn out.

When the kiln is to be filled, a parcel of furze or faggots is laid at the bottom, over this a layer of coals, then a layer of limestone (which is previously broken into pieces, about the size of a man's fist), and so on alternately, ending with a layer of coals, which is commonly covered with sods or turf, in order to keep the heat as intense as possible. The fire is then lighted at the apertures; and when the limestone towards the bottom is completely calcined, the fuel being considerably exhausted, the limestone at the top subsides. The labourers then put in an addition of limestone and coal at top, and draw out at bottom as much as they find thoroughly burned; and thus go on, till any quantity required be calcined*.

In some counties in England, particularly in that of Northampton, it is a common practice to burn limestone with furze. The kilns used, which are commonly known by the denomination of flame-kilns, are built of brick; the walls, from four to five feet thick, where they

are

* When limestone is burned with coals, from $2\frac{1}{2}$ to $3\frac{1}{2}$ bushels, on a medium 3 bushels, of calcined limestone are produced for every bushel of coals used.

are not ſupported by a bank or mound of earth. The inſide is nearly ſquare, being twelve feet by thirteen, and eleven or twelve feet high. In the front wall there are three arches, each about one foot ten inches wide, by three feet nine inches in height. When the kiln is to be filled, three arches are formed of the largeſt pieces of limeſtone; the whole breadth of the kiln, and oppoſite to the arches in the front wall. When theſe arches are formed, the limeſtone is thrown promiſcuouſly into the kiln, to the height of ſeven or eight feet, over which is frequently laid fifteen or twenty thouſand bricks, which are burned at the ſame time with the limeſtone. When the filling of the kiln is completed, the three arches in the front wall are filled up with bricks almoſt to the top, room being left in each ſufficient only for putting in the furze, which is done in ſmall quantities, the object being to keep up a conſtant and regular flame. In the ſpace of thirty-ſix or forty hours, the whole limeſtone, about one hundred and twenty, or one hundred and thirty quarters, together with the fifteen or twenty thouſand bricks, are thoroughly calcined. Such a kiln as is here deſcribed, may be ſeen near Wellingborough in Northamptonſhire.

In ſeveral counties in Scotland, as Moray, Banff, Aberdeen, Dumfries, &c. which are all ſituated at a great diſtance from coal, it is a common practice to burn limeſtone with peat; and, conſidering

conſidering the rude ill-conſtructed kilns which are uſed for the purpoſe, it is aſtoniſhing with what ſucceſs the operation is performed. In ſome of theſe diſtricts, limeſtone is ſufficiently calcined with peats, laid *ſtratum ſuper ſtratum*, in kilns formed of turf; but, owing to the quantity of aſhes which fall from the peat, the quality of the lime is conſiderably injured; and from the open and expoſed ſituation of many of theſe kilns, the waſte of fuel is immenſe.

The moſt common method of burning limeſtone with peat, is in kilns conſtructed ſomewhat ſimilar to thoſe in the diſtricts where furze is uſed as the only fuel. There are in general only two arches, or fire-places, and the peats are thrown into the bottom of theſe arches, the fronts of which are ſeldom cloſed up; by which means, the wind has often great influence in retarding the operation, and frequently prevents the complete calcination of the limeſtone.

An improvement might be made on theſe kilns, at a very trifling expence:—If an iron grate were laid acroſs the bottom of the arch, with a place below for the aſhes to fall down, and the front of the arch cloſed up by a door made of caſt-metal, one third of the fuel might be ſaved, and the operation performed in a ſhorter time, and with much greater certainty, than by the method now practiſed.

When lime is intended to be uſed alone as a

manure, great care ſhould be taken to prepare it properly, ſo that it may incorporate readily and intimately with the ſoil. To effect this, when lime is carried from the kiln, or the port where it is landed, to the field where it is to be applied, it ſhould be laid in a large heap, and, if poſſible, adjoining to ſome ſtream or rivulet, where ſuch a quantity of water may be thrown upon it, as is juſt neceſſary for reducing it to a fine powder, without its getting into cakes or lumps; which frequently happens, when laid in ſmall heaps, and allowed to fall or ſlake by the influence of the weather.

The mode of applying lime varies in almoſt every diſtrict. In the counties of Warwick, Devon, Hereford, Lanark, and ſome others, it is uſed to a great extent in mixtures or compoſts. In Weſtmoreland, Caernarvon, Aberdeen, Banff, and ſome parts of Perthſhire, as well as in ſeveral other diſtricts, lime is laid on graſs-lands a year or two before they are broken up for corn-crops. In Yorkſhire, Warwickſhire, &c. lime is applied as a means of deſtroying ling, fog, &c. and with great ſucceſs; but the manner in which this valuable manure is moſt generally applied, is previous to ſowing turnips, or on fallow, as a preparation for a crop of wheat. In either of theſe laſt-caſes, it is of the greateſt importance to have the ſoil as much pulverized as poſſible, by frequent ploughings and harrowings before the lime

lime is laid on; otherwiſe it cannot be ſpread over the land with exactneſs, nor operate equally on every part.

There are few counties in Great Britain, where limeſtone is not found; and fewer ſtill, where lime is not either in general uſe, or partially introduced as a manure. With reſpect to the uſe of lime, or the benefit derived from it, as a mean of fertilizing the ſoil, ſome are of opinion, that it promotes vegetation, by ſtimulating or forcing the ſoil with which it is incorporated to exert itſelf; others imagine, it promotes vegetation, by enriching the ſoil, and thereby adding to the quantity of vegetable food. Various other opinions, different from theſe, and in ſome inſtances oppoſite to each other, have been entertained, reſpecting the manner in which lime operates; but all that we yet know with certainty on the ſubject, is collected from practice and experience, whereby it is proved that lime, *ſome how or other*, operates ſo as frequently to produce luxuriant crops on ſoils, which, before the application of that manure, were comparatively of little value. And further, that on all ſoils which are treated properly after being thoroughly limed, its beneficial effects are diſcernible by the moſt curſory obſerver.

The quantity of lime applied to the acre ſeems hitherto fixed by no certain rule, either in regard to the nature of the different ſoils, the modes of cropping

cropping afterwards adopted, or the ſuperior quality of one kind of limeſtone beyond another. In the counties of Lanark and Weſtmoreland, from one hundred to five hundred buſhels of lime-ſhells, after being reduced to powder*, are applied to the Engliſh ſtatute acre †. In the county of Nottingham, the ordinary quantity does not exceed ſeventy or eighty buſhels. In the counties of Cumberland, Weſt Lothian, Fife, Perth, Angus, Mearns, *&c.* from one hundred to one hundred and fifty buſhels is the uſual quantity; and this laſt may be ſtated as the general average quantity commonly uſed in all the other parts of Great Britain.

It has been long a ſubject of diſpute, whether lands are benefited by a ſecond, third, or many repeated burnings. It is aſſerted on the one hand, that frequent limings are rather injurious than beneficial; and on the other, that the practice

* The buſhel of lime-ſhells, or calcined limeſtone, generally yields from two and a half to three buſhels of powdered lime. The price of the buſhel of lime-ſhells, at the kilns, varies from four-pence to ſix-pence; the general average over Great Britain, may be rated at four-pence halfpenny.

† Whether the value of the crops that are reaped after ſuch extraordinary liming, is ſo much ſuperior to what is produced in other diſtricts, from the application of a leſs quantity, as to juſtify the propriety of ſuch a practice, is a circumſtance that merits particular inquiry.

tice has been proved advantageous, by the ſure teſt of experience. It is probable, that the propriety or impropriety of repeated limings, depends more on the nature of the ſoil, and the modes of management afterwards adopted, than on any other circumſtance connected therewith.

In Berwickwire, and the Carſe of Gowrie, lime is applied two or three times in the courſe of twenty years; and with ſuch advantage, as to induce the farmers to continue the practice, notwithſtanding the great expence to which they are ſubjected, in conſequence of the very great diſtance whence they muſt bring the lime. In Cumberland, Lanark, and ſome other counties, repeated limings, unleſs the lime is mixed with ſome other ſubſtances, are found rather injurious than beneficial. It is impoſſible to account for ſuch variations in the practice of manuring land with lime, or its effects on the ſoil, without obſerving in the firſt place, that although there has been as yet no general rule eſtabliſhed, by which a farmer can determine what quantity of lime is beſt ſuited to a particular ſoil, yet in practice, a greater quantity is laid on ſtrong, denſe, ſtubborn ſoils, than on thoſe of a more open, friable nature. In the ſecond place, that the diverſity of meaſures by which lime is ſold at the different kilns, is often ſo great, as to leave it doubtful whether a farmer in one part of the iſland, who applies three chaldrons to the acre, does not uſe

leſs

leſs than him, who in another diſtrict applies two. And in the third place, that the quality of lime-ſhells is ſo extremely different, that in ſome caſes the farmer who lays five chaldrons on the acre, does not apply a greater quantity of effective manure, than another who limes an acre with three.

It has already been obſerved, that various and contradictory opinions are entertained, in regard to the effects of lime as a manure. Not leſs ſo are the rules laid down as to the quantities to be applied, and the modes of application. This ſeems in a great meaſure owing to the little attention that has hitherto been beſtowed, to reduce the practice of lime-huſbandry under one general national ſyſtem. One ſtep towards this would be, to eſtabliſh a ſtandard for the meaſure of lime all over the iſland; another, of no leſs importance, and which naturally falls under the immediate cognizance of the Board of Agriculture, would be, to aſcertain, by chymical analyſis, and to publiſh an account of, the comparative quality of the lime at preſent working in every quarry in Great Britain. Were theſe two plans carried into effect, much new light would be thrown on this important branch of huſbandry; as thereby every farmer in the iſland would, in time, acquire a ſure rule by which he might regulate his own practice. If, for inſtance, a farmer who cultivated a clay ſoil, within reach of lime,

lime, which contained only ſixty parts out of a hundred of calcarious earth, were informed, that the eſtabliſhed practice in another diſtrict, where the ſame kind of ſoil prevailed, was to apply one hundred buſhels of lime, which contained eighty parts of calcarious earth, he would find it neceſſary to apply nearly one hundred and thirty-four buſhels, to manure his field to the ſame extent. In ſhort, if one general meaſure for lime were eſtabliſhed, and correct tables of the quality of the lime of one quarry, compared to that of another, could be determined, it would pave the way for a more uniform practice of lime-huſbandry, than can otherwiſe take place: While the philoſophical farmer would be enabled to draw concluſions much more correct, than any he can form during the continuance of the preſent indefinite ſyſtem.

Chalk.—Chalk is a white, foſſil ſubſtance, generally found in maſſes; although in the Iſle of Wight, and ſome other places, there is a ſoft, unctuous, gluey ſort, very much reſembling marl, and which is applied to lands nearly in the ſame manner.

The firſt account we have of chalk being uſed as manure in this iſland, is given by Pliny, who ſays it was the cuſtom of the Britons to chalk their lands, whereby they received a great and laſting improvement.

Chalk

Chalk abounds in Suſſex, Kent, Surry, Herts, and many other of the ſouthern counties; but, ſo far as the writer knows, the Eaſt Riding of Yorkſhire is the moſt northerly diſtrict where it is met with. When it is found on the ſides of hills, as about Gravesend in Kent, the expence of digging it is very trifling; as the workmen, who are accuſtomed to the buſineſs, after undermining it a good way, dig a trench at the top, as far from the edge as it is undermined, which being filled with water, ſoaks through in a ſhort time, and then the whole flake falls down at once. Where they are obliged to dig for it to a conſiderable depth, and draw it to the ſurface in buckets, the expence is greatly increaſed, and cannot be reckoned at leſs than three-pence the buſhel.

Chalk is, for the moſt part, uſed as manure in its crude ſtate; but in Eſſex, Suſſex, the Eaſt Riding of Yorkſhire, &c. it is calcined in the ſame manner as lime, and ſold at the kilns from 4 d. to 6 d. the buſhel. It would appear from the long and eſtabliſhed practice of all the farmers in thoſe diſtricts, where chalk abounds, that it has the remarkable property of producing beneficial effects in ſoils diametrically oppoſite. The writer has ſeen it applied to the lighteſt ſoils in Surry, and to the ſtrongeſt clays in Eſſex, and has been aſſured by ſeveral reſpectable farmers in both counties, that it operated very powerfully towards

towards the increaſe of the crops, and the improvement of the ſoil.

In Eſſex, Kent, the Iſle of Wight, Herts, &c. chalk is applied to ſtiff, cold, clay ſoils in large quantities (twelve or fourteen waggon-loads, and ſometimes more to the acre), with remarkable ſucceſs. The expence of chalking lands in Eſſex, and ſome parts of Kent, owing to the diſtance of carriage, is very great. Some idea may be formed of the expence incurred, by obſerving, that the value of chalked land, is frequently eſtimated between an outgoing and entering tenant, when the chalk has been only a few years laid on, at L. 4, and frequently L. 5 the acre.

Chalk, when intended for manure in its crude ſtate, is generally dug in the end of autumn; ſo that it may be ſhattered and crumbled by the froſt, when lying on the ſurface of the field during the enſuing winter. If any large pieces remain unreduced by the influence of the weather, they are carefully broken in the ſpring, by labourers employed for the purpoſe;—a precaution which is conſidered eſſentially neceſſary in chalk-huſbandry, not only for making it ſpread more equally, but alſo for making it incorporate more intimately with the ſoil.

When chalk is calcined and applied as manure, the ordinary quantity is from 100 to 200 buſhels to the acre; but it would appear, that, when thus applied, the effects are not laſting, as the

ſame field is frequently manured to the extent above mentioned every four or five years. The ſame complaints againſt the inefficacy of repeated chalkings, as of repeated limings, are very common; and the farmers, who cultivate light ſoils, have, in general, altered their practice in this reſpect, ſo far as to uſe chalk only in mixins or compoſts. Theſe are commonly formed one-third of chalk, and two-thirds of ſcourings of ditches, ſcrapings of roads, &c. and when allowed to remain a conſiderable time before uſing, are found excellent manures, eſpecially for light ſoils. On the ſtronger ſoils, where a large quantity of chalk is laid on at one time, the effects in the ſucceeding crops are ſaid to be eaſily diſcernible for fifteen or twenty years. After ſuch a lapſe of time, there can be little doubt, but chalk may be again applied with nearly, if not fully as great advantage as at firſt. With regard to the modes of applying chalk as manure, either in its crude or calcined ſtate, nothing particular occurs worthy of remark, beyond what is ſtated reſpecting lime.

Marl.—Marl is a foſſil ſubſtance, found in a great number of the counties both of England and Scotland, in different ſituations, and at various depths. Pliny mentions marling land as an improvement known to the Greeks, but more peculiar to Britain and Gaul, and thus deſcribes it: "There

"There is another way of nouriſhing earth by "earth, which has been found out in Britain "and Gaul. It is thought there is a greater de- "gree of fruitfulneſs in this kind than in any "other. It is a certain richneſs in earth, like "the kernels in animal bodies, that are increa- "ſed by fatneſs."

There are properly three kinds of marl uſed as manure in Great Britain,—the ſtone, the clay, and the ſhell. The firſt derives its name from its reſemblance to ſtone; the ſecond, from its likeneſs to clay; and the third, from the ſhelly ſubſtances of which it is chiefly compoſed.

The ſtone or ſlate, ſometimes called flag marl, according to the different appearances which it exhibits, is a compoſition of calcarious earth, ſand and clay. It is the ſand which hardens it, and tends to give it the apparent conſiſtence of ſtone; and in proportion to the ſand which it contains, it approaches to ſtone or clay marl. Clay-marl is a compoſition of calcarious earth and clay. Theſe marls are of various colours, as brown, blue, yellow, red, and mixed. Shell-marl, when unmixed with ſand or moſs, is almoſt entirely calcarious, conſiſting of ſhells of fiſh, which being ſoftened and reduced to powder in water, acquires the appearance of fine white earth.

In many parts of theſe kingdoms, indications of marl are viſible even to the moſt negligent eye,

eye, eſpecially on the ſides of deep hollow roads, and on the borders of rivers. As many valuable treaſures no doubt ſtill remain neglected, although expoſed to public view, owing to many farmers, and others, not knowing the proper methods of proving what is real marl, it may be proper to ſtate the various ways in which marl may be moſt eaſily and moſt ſatisfactorily known: *Firſt, It may be proved by Air*:—If a lump of true ſtone or clay marl be expoſed to the air, it will, in a ſhort time, break into ſmall pieces. *Secondly, by Fire*:—When a piece of real marl is dry, break it into as ſmall particles as poſſible, and put a handful into a hot coal fire; it will crackle in the ſame manner as if ſalt had been thrown therein. *Thirdly, by Water*:—Put a piece of dried marl into a wine-glaſs, and pour gently as much water thereon as will cover it; if true marl, it will gradually diſſolve into a liquid, or ſoapy ſubſtance, and at the ſame time ſhoot up many ſparkles to the ſurface of the water. Another, and the moſt certain criterion, by which to prove marl of all kinds, is, to put a little in a wine-glaſs, and pour gently over it a ſmall quantity of aquafortis, or ſome other ſtrong acid: If it effervеſce, it is a ſufficient proof of its being marl; and the degree of the effervеſcence at the ſame time aſcertains its quality.

Marl, of one kind or other, is uſed as manure in nearly one half of the counties of Great Britain;

tain; but its value, and the proper modes of applying it, are better known and underſtood in ſome counties than others.

In Lancaſhire, they have abundance both of ſtone and clay marl: the former is applied to the ſtrong clay ſoils, the latter to the light, loamy, and ſandy lands. The medium quantity laid on the acre, is about three cubic roods, of eight yards to the rood. The expence, in a great meaſure, depends on the diſtance of carriage; but generally runs between ſix and ten pounds the acre. It is commonly laid on graſs lands, a year or two before they are broken up, although ſometimes on lands in a courſe of tillage. In either caſe, great care is taken to ſpread it as equally as poſſible on the ſurface, and to break any lumps on which the weather has not had ſufficient influence. Its effects in producing good crops, have been proved by many years experience. The application of clay-marl to the light ſandy ſoils in Suffolk, has been the means of greatly improving thoſe ſoils; and the crops which they produce, after being marled, if the lands be not too ſeverely cropped, are ſo ſuperior, as fully to warrant the expence. The quantity laid on the acre is about eight loads, or nearly 2500 buſhels*.

It is to the adjoining county of Norfolk, however,

* In the Iſle of Man, they lay on clay-marl at the rate of nearly two hundred tons the acre.

ever, that we are to look for the wonderful effects produced by marl. Theſe are ſo great, that lands which, forty or fifty years ago, did not rent at eighteen-pence the acre, now give upwards of twenty ſhillings. There are two kinds of marl in that county; the one of a white, or rather yellow colour, conſiſting almoſt entirely of calcarious earth; the other may properly be denominated clay-marl, but from the ſmall quantity applied to the acre, it muſt be of a very rich quality, compared to other marls; otherwiſe it could not operate ſo powerfully on the ſoil. Of the firſt, from ten to fourteen loads are ſufficient for the acre; and of the laſt, from thirty to forty. The mode of application varies. Sometimes it is uſed as a preparation for a crop of barley or turnip; and is frequently laid on clover-ley, before being broken up for wheat. If the county of Norfolk has been benefited by the marls above mentioned, that of Forfar has reaped as great advantages from ſhell-marl. Shell-marl, of a moſt excellent quality, has been for a good many years diſcovered in various parts of that county; and the improvements that have taken place, in conſequence of the general and judicious uſe of that valuable manure, exceed perhaps any thing of the kind, that ever happened in the ſame period, in any other county in Great Britain. The average quantity laid on the acre, is about four hundred cubic feet; and in

reſpect to the mode of application, it is in every reſpect ſimilar to that mentioned above, as being the practice in Norfolk. Great caution is neceſſary in uſing marl, and in adopting proper rotations of cropping after it is applied. If a large quantity be laid on at once, eſpecially on light lands, or if marl be laid on a ſecond time, in the courſe of a few years, and a number of ſevere crops afterwards taken, the lands will be greatly exhauſted. This was experienced in many inſtances, when marl was firſt uſed as manure in Forfarſhire: the tenants, for the moſt part, ignorant of the effects it would produce, laid on large quantities; which creating a great fertility, they went on ſowing oats, and other ſevere crops, till the ſoil became little better than a dead ſubſtance. This alarmed the proprietors, and induced them to include certain covenants in their leaſes, ſo as to prevent any prejudicial conſequences in future. Theſe have been the means of eſtabliſhing a more regular ſyſtem of marling huſbandry in that county, than perhaps is to be found in any other part of the iſland. When a field is marled, the tenant is bound to lay it out in graſs, with the next or ſucceeding crop; and to allow it to remain three or four years in paſture. When broken up for corn, a certain ſpecified number of crops only are to be taken, before it is again laid out to graſs; and ſo on, during the currency of the leaſe. The tenants are alſo debarred

debarred from laying on marl a ſecond time on the ſame field, in the courſe of one leaſe, which is commonly for nineteen years, unleſs it be properly mixed with dung, or other ſubſtances. Thus the improper practice of over-cropping the land after marling, and the no leſs injudicious cuſtom of repeated marlings at ſhort intervals, are both prevented; and under theſe reſtrictions, which are in general very ſteadily adhered to, marl is found in Forfarſhire a moſt beneficial manure, and the lands continue in a progreſſive ſtate of improvement. Although it appears doubtful whether marl, unleſs laid on in large quantities, be advantageouſly applied to ſtrong clays, yet it ſeems univerſally agreed, that for all light, dry, ſandy, and gravelly ſoils, it is the beſt manure yet diſcovered. That being the caſe, every occupier of ſuch lands ought to be extremely attentive in ſearching for marl; and the proprietors and farmers in thoſe diſtricts where it has been lately diſcovered, as Berwick, Weſt-Lothian, Nairn, *&c.* will eſſentially promote their own intereſts, by bringing into general uſe a manure, which has been found in ſo many other diſtricts a ſource of real wealth, and a means of ſubſtantial and extenſive improvement.

Shells or Sea-ſand.—Sea-ſand containing great quantities of broken fragments of ſhells, is thrown up in almoſt all the creeks and level places round

the

the coaſts of theſe kingdoms, and is uſed in ſeveral counties to great advantage, as an article of manure; particularly on the ſouth and ſouth-weſt coaſts of the iſland. It is of different qualities: that which is taken from under the water, or from banks which are covered once every tide, and which contains the greateſt quantity of ſhells, is eſteemed the beſt. The benefits ariſing from the application of ſea-ſand to clay, and other ſtrong ſoils, for which by every account it is beſt adapted, although ſomewhat ſlow in appearing, are known to be very laſting. The ſlowneſs in appearing is eaſily accounted for, by obſerving that it conſiſts of hard bodies, ſuch as the ſand itſelf, ſhells, fragments of coral, and other ſubſtances, which require time to diſſolve; and for that reaſon it muſt operate as a more laſting manure, as in proportion to the period neceſſary to make it incorporate intimately with the ſoil, ſo will be the duration of its fertilizing effects. Sea-ſand has been long uſed as manure in Cornwall, Devon, and ſome of the counties of Wales; and has lately been introduced with equal ſucceſs in Cumberland, Galloway, Yorkſhire, and ſome other diſtricts. But the great value of ſea-ſhells, or ſea-ſand, is hitherto but little known; at leaſt the uſe of theſe foſſils, as a means of improving the ſoil, is confined to a very few diſtricts, compared to the numbers which, from their ſituation on the coaſts, have an equal op-

portunity of deriving benefit from it. The quality of ſea-ſand as manure, no doubt depends on the quantity of ſhells and other calcarious ſubſtances, which it contains. This can be determined, in ſome reſpect, by the degree of effervescence which takes place when any ſtrong acid is applied, (as in the manner pointed out for trying marl), and by the quantity of reſidium that falls to the bottom of the glaſs, when the effervescence is over. The quantity applied to the acre, is from twenty to twenty-five tons, or about three hundred buſhels. It is ſometimes laid on fallow, ſometimes as a preparation for a crop of barley; but its effects are more immediately, and to a greater extent diſcernible, when it is applied to graſs lands; as it renders the ſucceeding crops extremely luxuriant, and alſo inſures abundant returns of grain, when the fields are again brought under cultivation.

That this kind of manure is to be found in every diſtrict ſituated along the coaſts of theſe kingdoms, will hardly admit of a doubt. Its efficacy on all ſorts of ſoils (although greateſt on clay and ſtrong loam) has alſo been proved; and the value in which it is held in thoſe diſtricts, where its properties have been longeſt known, is aſcertained from the circumſtance of its being frequently drawn to the interior part of the country, by land carriage, ten or fifteen, ſometimes twenty miles. Sea-ſhells, or ſea-ſand, not-

withſtanding they have been long diſcovered as a uſeful manure, have hitherto been little attended to, except in a few diſtricts. It would be highly praiſe-worthy in the members of that national Board, which is eſtabliſhed for the expreſs purpoſe of promoting agricultural improvements, to devote a portion of their time to an object ſo important, as that of calling the attention of the proprietors and farmers (whoſe local ſituation afford them opportunities) to the uſe of this manure, as the means of fertilizing the ſoil. Suppoſe ten miles the extreme diſtance to which ſea-ſand could be carried with advantage; yet how great a proportion of this iſland might be thus manured, taking the mean diſtance of carriage from the coaſt at only five miles!

Aſhes.—Aſhes are the earthy parts of combuſtible ſubſtances, remaining after they are burnt. There are three ſorts of aſhes uſed, in conſiderable quantities, as manures in theſe kingdoms. It is proper here to take notice of them; namely, wood-aſhes, coal-aſhes, and peat-aſhes. The wood-aſhes intended to be deſcribed, are what are commonly known by the name of ſoap-aſhes, or ſoapers waſte; being a compoſition of wood-aſhes and lime, remaining after the ſoap-makers have drawn off their lees. Soapers aſhes were firſt uſed by the Flemings, and conſidered by them as an excellent manure. In England,

where

where the mode of application is better known than in Scotland, they are applied, for the moſt part, to old paſtures, rather than to tillage-lands. From one hundred to one hundred and ſixty buſhels are laid on the acre of paſture-lands. When applied to lands in tillage, they are commonly mixed with dung and earth, in the proportion of one load of aſhes to ten of compoſt; and before the ſeed furrow is given, ten or twelve loads of this compoſt is ſpread on each acre.

Coal-Aſhes—are ſaid to contain a large portion of calcarious earth; and on that account, are reckoned ſingularly beneficial to cold ſour lands. Coal-aſhes can only be procured, in conſiderable quantities, in the neighbourhood of great cities, where coal is uſed for fuel. The gardeners and farmers in the vicinity of London know their value, and uſe them to great advantage; particularly in bringing thoſe lands into order, which had been dug for brick earth. After ſpreading the coal-aſhes on the grounds whence the brick-earth had been taken, they commonly plant beans, and with the ſucceeding crop ſow graſs ſeeds, both of which ſucceed extremely well. Coal-aſhes are uſed in other parts of Middleſex, Surry, and ſome of the adjoining counties; and alſo in Wiltſhire, as a top-dreſſing* for

* In England, the ſowing, or ſpreading with the hand, ſuch manures as can only be procured in ſmall quantities, as

for young clovers, and old paſture-lands, and ſometimes for wheat.

Peat-Aſhes.—In many parts of theſe kingdoms, peat-earth, cut and dried in the courſe of ſummer, is the only fuel. The peat dug from the moſſes, that are ſo firm as to bear cattle to tread on, is the beſt, both for fuel, and afterwards for manure. The aſhes of what is pared from the ſurface of heaths and commons, by the cottagers, as in Bedford, and ſome other counties in England, and in the low parts of Moray and Nairn* in Scotland, are of little value, compared to thoſe above mentioned. It was formerly very common in the counties of Aberdeen, Banff, Moray, &c. to manure the moſs-lands by paring and burning the ſurface ſoil, in the manner ſtill performed in different parts of England, and on various ſoils; but in conſequence of the injury which theſe lands thereby ſuſtained, the proprietors prohibited ſo baneful a practice. It is probable, Berkſhire is the only diſtrict in Great Britain, where peat-aſhes, without mixture of any

as aſhes, ſoot, rape-duſt, &c. has been long practiſed. It is commonly called top-dreſſing, and is always performed in the ſpring. This method is occaſionally adopted by ſome few individuals in Scotland, when pigeon-dung can be procured; but the practice is by no means general.

* There called Scaddings.

any other ſubſtance, is at preſent generally uſed as manure. The aſhes of peat, dug from an extenſive meadow in that county, have been proved, by the experience of ſixty or ſeventy years, to be a moſt excellent manure, when uſed as a top-dreſſing on almoſt all kinds of crops; as oats, wheat, barley, turnips, clover, ſainfoin, meadows, paſtures, &c. The quantity uſed is about twenty buſhels, more or leſs, as the condition of the land ſeems to require; and the price about three-pence, or four-pence the buſhel. To ſuch an extent is this mode of manuring carried on in that county, that the proprietors receive two or three hundred pounds the acre, for a liberty of cutting and carrying off peat to the depth of five or ſix feet.

It would be abſurd to ſuppoſe, that the peat-aſhes of Berkſhire are ſuperior, as manure, to thoſe in every other part of the iſland; and as their effects in that county, when applied to the ſoil, have been conſpicuous for a great number of years, it is certainly a circumſtance meriting the attention of thoſe, who reſide where peat is the only fuel, to aſcertain whether peat-aſhes in theſe diſtricts, do not poſſeſs all the fertilizing qualities of thoſe in Berkſhire. The experiment is eaſily made: all that is neceſſary being to keep the aſhes dry, and under cover during winter; and to ſprinkle them with the hand over the crops in the ſpring, and at the rate above mentioned.

Soot.

Soot.—Soot may be called condenſed ſmoke, a ſubſtance formed in chimneys; and, whether compoſed of vegetables or minerals, is conſidered good manure. It is ſaid to cheriſh and give nouriſhment to graſs, to kill the noxious inſects that infeſt the corn, and to protect it from the effects of froſts or chilling rains; and what is alſo of great conſequence, to kill the moſs that ſo often abounds in meadows and old paſtures. This uſeful manure can be obtained in conſiderable quantities only from great cities, or large manufacturing towns. The price in London, whence great quantities are carried to the adjacent diſtricts, is eight-pence the buſhel. The ordinary allowance, is from twenty-five to thirty-five buſhels an acre. Soot is uſed in many parts of England, as Middleſex, Buckingham, Glouceſter, Wilts, Lancaſhire, Yorkſhire, *&c.* The mode of application is chiefly as top-dreſſings for young clover, ſainfoin, and old worn-out meadows. The beſt ſeaſon for laying it on, is in February or March. It is carefully ſpread over the field with the hand, and always ſucceeds beſt, if rain immediately enſues.

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SECTION II.

Vegetable Manures, in their natural or putrid State.

Most vegetables, especially those of the succulent or juicy kind, afford excellent manure; and the Roman writers on husbandry, to whose opinion the best farmers of the present day ought to pay deference, all recommend the ploughing down of green plants, as a means of enriching the soil.

Green crops of all kinds, as pease, beans, buck-wheat, tares, &c. if ploughed-in when in full bloom, at which period they contain the greatest quantity of sap, cannot fail to be attended with beneficial effects. In Scotland, this mode of improving the soil, and preparing it for producing valuable crops, is scarcely known; and is but very little practised in England. This system of husbandry is indeed sometimes adopted in Warwickshire; and as might be expected, with success. Considering at how small an expence of prime cost, carriage, and other charges, this profitable manure may be obtained, it is surprising that a mode so well calculated for improving and enriching the soil, should be so little attended to in

in Great Britain. It is obviouſly beyond all others the moſt economical; and might, no doubt, be adopted with propriety on very many occaſions, in place of a complete ſummer fallow, as a preparation for wheat. The price of the ſeeds, which is almoſt the only expence, would be much more than compenſated, by the ſaving that would take place in the carriage of any other kind of manure. The practice of ploughing-in green crops, as recommended above, might be much improved by applying a certain quantity of lime, chalk, marl, ſea-ſand, or other manure containing calcarious earth: Theſe would tend to haſten the putreſcence of the vegetable ſubſtances buried in the ſoil, and bring them ſooner into a proper ſtate for affording nouriſhment to the plants which ſucceeded.

Weeds.—The weeds found in ditches, ponds, lakes, or ſtagnating rivers, if dragged out before they begin to ſeed, and laid in large heaps to rot, and all other weeds, managed in the ſame manner, are good manures. At the ſame time, it ought to be particularly obſerved, that all weeds intended to be converted into manure, ſhould be cut down when they begin to flower; for if they are allowed to ſtand till they be nearly ripe, ſome kinds of them will perfect their ſeeds after they are cut down, and thereby become very prejudicial. In preparing theſe vegetables for being

moſt ſubſtantially uſeful as manure, it would be proper to mix them with layers of lime, chalk, or marl, and earth; by which means the putrefaction would not only be accelerated, but the compoſition alſo greatly improved. Compoſts ſo made, and properly covered over with earth, for a few months, form a ſolid maſs of excellent manure for any kind of ſoil.

Sea-weeds, or Sea-ware.—Every plant that grows on the rocks that are either covered or occaſionally waſhed by the ſea, is proved by experience to be a valuable manure. Thoſe plants which grow on the rocks that are always covered by the ſea, being the moſt luxuriant, and containing a greater quantity of the ſubſtances which promote vegetation, are eſteemed the beſt. This kind can be procured only on extraordinary occaſions, as they are always covered to a conſiderable depth by the ſea. When a ſpring tide and a high-ſwelling ſea happen at the ſame time, their roots are looſened, and they are thrown aſhore in the vicinity of rocky coaſts, and frequently in large quantities.

Sea-weeds are generally uſed as manure on all the coaſts of theſe kingdoms; and are in ſuch requeſt in ſome counties in the north of Scotland, particularly in thoſe of Aberdeen, Banff, and Moray, that it was the practice a few years ago (and it is probably ſtill continued) for the farmers

farmers and their ſervants to ſet out at midnight, with horſes and carts, even in the depth of winter, to attend the in-coming tide, and carry without flood-mark, as much ſea-weed as they could poſſibly collect. In ſome places, theſe weeds are carried directly from the ſhore and ſpread upon the lands, as a preparation for wheat, barley, potatoes, or turnips, and immediately ploughed-in. In other diſtricts, they are laid in heaps till they rot, and then applied at the rate of fifty or ſixty ordinary loads to the acre; or ſometimes mixed with earth and other ſubſtances into a compoſt. Which of theſe methods is beſt, it may be difficult to determine; but as this kind of manure is in very general uſe in all the maritime counties of Great Britain, it may be proper to take notice of the effects produced by ſea-weeds in different diſtricts. In the report made to the Board, of the preſent ſtate of agriculture in Berwickſhire, by Mr Lowe, a gentleman poſſeſſing great knowledge and experience in agricultural affairs in general, and whoſe ſituation in life gives him ample opportunities of acquiring a thorough knowledge of thoſe of Berwickſhire in particular, it is ſtated, that "Sea-ware is greatly "uſed in barley-ſeed time; both as it gives an "additional value of one ſhilling, or more, *per* "boll for ſeed, being earlier grain by ten days "than that from any other manure, and is like-"wiſe in great requeſt by brewers, as no other

"barley

" barley malts ſo well." In oppoſition to this, it is mentioned in the report of Aberdeenſhire, written by Dr Anderſon, whoſe character as an agricultural writer is well known, that, " On " the northern ſhores of this county, conſider- " able quantities of ſea-weeds, uſually called " ſea-ware, are caſt on the ſhore, which the " farmers are very induſtrious in ſeizing, and " applying as manure. It is always applied to " the fields that are to be ſown with bear. It " produces great crops; but the quality is ſo " much inferior to that of other bear, that it " forms a diſtinct claſs in the ſiars of the coun- " ty." This ſeeming contradiction will probably be found to ariſe from the ſuperior mode of cropping adopted in Berwickſhire, beyond that in Aberdeenſhire; as the difference in climate, or in the ſoil adjoining to the ſhores of theſe diſtricts, is certainly not ſo conſiderable as to account for ſo great a variation in the quality of barley, produced from the application of ſea-weeds.

Tanners Bark.—Bark, after the tanners have uſed it for dreſſing leather, is found a uſeful manure. It is eſteemed beſt for ſtrong cold land, which it tends to looſen and ſeparate, ſo as to render it more free and workable. When laid on graſs land, it ſhould be ſpread about Michaelmas, that it may be waſhed into the ground by the

the winter rains. When uſed for tillage lands, it ſhould be laid on before the ſeed furrow is given, ſo that it may be properly mixed with the ſoil. From thirty to forty ordinary cart-loads, are reckoned ſufficient for an acre. An experiment was lately made in Warwickſhire, by mixing two waggon-loads of bark with one of unſlaked lime; which, after being mixed together for a week, was uſed as a top-dreſſing both for a crop of turnips and on graſs lands, and was found to be an excellent manure. It is much to be regretted, that farmers of knowledge and obſervation, do not turn their attention more to making ſuch experiments as that above mentioned.

Oil-Cakes.—That is, the cakes of lint ſeed, rape-ſeed, &c. after the oil has been preſſed from them. Theſe are found exceedingly good for fattening cattle; and in ſeveral counties of both kingdoms, conſiderable quantities are uſed in that way. In Lancaſhire, Yorkſhire, Norfolk, and a few other diſtricts in England, they uſe oil-cakes, after being reduced to powder, by means of a machine contrived for the purpoſe, as a manure, ſometimes for wheat and barley crops, but more generally for turnips. It is always ſown by hand, and harrowed-in with the ſeed. The quantity uſed, is from three to ſix quarters the acre. The price is extremely different, in different

ent diſtricts. In Lancaſhire, it is from ſix to eight ſhillings the quarter: In ſome parts of Yorkſhire, it is from ſixteen to twenty. Experience has proved, that the ſucceſs of this manure depends, in a great meaſure, on the following ſeaſon. If rain happen to fall ſoon after the rape-duſt is applied, the crop is generally abundant; but if no rain fall for a conſiderable period, the effects of this manure are but little diſcernible, either on that immediate crop, or on thoſe which ſucceed.

Malt Duſt,—or the duſt that ſeparates from malt in the act of drying, is reckoned a moſt excellent manure; but, except in ſome few particular places, where the malting-trade is carried on to a great extent, as in the counties of Huntingdon, Hertford, Berks, Nottingham, &c. it cannot be procured in any conſiderable quantity. It is uſed as a top-dreſſing for barley, young clovers, and ſometimes for wheat and turnips. The quantity commonly applied, is ſix quarters to the acre; and the price from five to ſeven ſhillings the quarter. A very minute account of ſeveral experiments tried, of the effects of malt-duſt, as a manure, will be found detailed in the Muſeum Ruſticum, vol. iii. page 277, *&c.*

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SECTION III.

Animal Manures;—as Bones, Woollen-rags, Dung, &c.

The richeſt and moſt generally uſed manures, are ſuch as are obtained from animal ſubſtances. They turn immediately into a putrid ſtate, without paſſing through the different ſtages of fermentation, to which all vegetable ſubſtances are liable. Fleſh, fiſh, blood, hair, wool, feathers, *&c.* being ſuch manures as cannot be obtained in large quantities, it is only neceſſary to obſerve in general reſpecting them, that as they tend to promote vegetation when applied to the ſoil, although they cannot be procured in ſuch quantities as to be uſed by themſelves, yet they ought not to be thrown away, but mixed with the other ſubſtances in the dunghill, which they will greatly enrich, by the fertilizing qualities they poſſeſs.

Bones,—horns, hoofs, ſhavings of horn, &c. are proved to be uſeful manures. Before ſubſtances of this kind are applied to the land, they are broken, in mills conſtructed for the purpoſe, into pieces about the ſize of a nutmeg (ſometimes much ſmaller); they are afterwards commonly

commonly laid in heaps, and covered up with earth, till a proper degree of fermentation takes place. Then they are ſpread on the ſurface, and immediately ploughed-in, as a preparation for wheat or turnip crops. This kind of manure is attainable only in the vicinity of large towns; and it is only in a few counties of England, where the practice of uſing it has become common. It is, however, pretty general in the counties adjoining to London, where a load of bones can be purchaſed for five or ſix ſhillings. In Warwickſhire, Yorkſhire, and ſeveral other counties, where there are large manufacturing towns, this kind of manure is alſo uſed. From thirty to forty buſhels is the ordinary allowance to the acre.

Woollen-rags,—and the refuſe of wool, although to be procured in conſiderable quantities in ſome particular places only, are alſo good manures. They are ſaid to be beſt adapted for light ſoils, as they readily imbibe moiſture, and retain it long. Their good effects as manure, have been often experienced on the light ſoils in Buckingham and Northampton ſhires, where they are frequently uſed for wheat and barley crops, and on clover leys. The quantity uſed, is about ſix hundred weight to the acre. The price, in Buckinghamſhire, is five ſhillings the hundred weight; at London, from two ſhillings and

and ſixpence to three ſhillings; and in Northamptonſhire four ſhillings, beſides two ſhillings the hundred-weight for chopping. The rags are chopped into ſmall pieces, of an inch or two ſquare; and when applied to lands intended for wheat or barley crops, they are carefully ſcattered on the ſurface, immediately before the laſt ploughing is given. Woollen-rags are alſo frequently uſed as a top-dreſſing; and, on light ſoils, with ſuch ſucceſs, as to afford an adequate compenſation for the trouble and expence. In order to give this kind of manure its full effect, it ſhould be laid in heaps, and covered up with earth for ſome time before it is uſed; by which means, it will operate more immediately.

Pigeons Dung.—The dung of pigeons, poultry, &c. is a valuable manure; and where it can be procured in ſuch quantities as to be uſed alone, anſwers extremely well when applied as a top-dreſſing for wheat, barley, clover, or indeed any ſort of crop. It is ſaid to be of a hot nature; which ſeems confirmed by the practice of thoſe who uſe this manure to the greateſt extent, as they commonly apply it to deep, ſtiff, cold ſoils. Pigeon-dung ſhould be broken as ſmall as poſſible, before it is applied; which is always done by the hand, and commonly in the ſpring. The quantity uſed, is about four quar-

ters to the acre. There is ſcarcely a branch of huſbandry, in which the Scotch farmers are ſo far behind their neighbours in England, as in the total neglect, or rather want of attention to, the proper application of thoſe more valuable manures, which can be had in ſmall quantities only, and in particular ſituations. In place of preſerving them by themſelves, and uſing them as top-dreſſings for the different ſorts of crops, by which means they would go a much greater length, they are thrown into the general maſs; and in conſequence of their being mixed with a great body of other ſubſtances, their particular effects are not diſcernible. Top-dreſſing is ſcarcely ever practiſed in Scotland, even on the farms of thoſe gentlemen, who, from their occaſionally reſiding in England, ſometimes for a conſiderable period, muſt have had many opportunities of obſerving the efficacy with which the practice of top-dreſſing young crops is attended in that kingdom. As this method of applying ſuch ſubſtances to the ſoil, as are known to contain in a greater degree the powers of promoting vegetation, has been from long experience found advantageous in England, there can be nothing to prevent its proving equally ſo in Scotland. The proprietors and more intelligent farmers in that kingdom, would therefore advance their own intereſts, and eſſentially promote improvements in agriculture, by following the example

ſet before them in this reſpect in the ſouthern part of the iſland.

Sheep Dung.—Sheep dung is univerſally allowed to be an excellent manure; but owing to the ſyſtem of ſheep-huſbandry eſtabliſhed in the two kingdoms, (which, although materially different from each other, yet agree in one particular, namely that the ſheep are never houſed), the quantity which can be procured, ſo as to be applied in the ordinary method, is very inconſiderable.

While the ancient ſyſtem of huſbandry was generally practiſed in Scotland, a flock of ſheep was deemed neceſſary on every farm, even in the moſt fertile parts of the country. Being regularly houſed at night, as is ſtill the common practice in France, Flanders, &c. and the floors of the houſes being occaſionally covered with ſtraw, ſand, or other light dry earth, a large quantity of valuable manure was thus obtained; which when applied to cold, wet ſoils, produced abundant crops. Since a ſpirit for incloſing, planting, and improvements in general, has been introduced, the original breeds of ſheep have been baniſhed to the mountainous diſtricts, where cultivation has hitherto been deemed impracticable. Within theſe few years indeed, ſome valuable breeds of ſheep have been brought from England; but they are generally kept in gentlemens parks, and are never penned nor houſed.

houſed: So that the quantity of ſheep dung applied to tillage-lands in the ancient manner, is very trifling, compared to what it was formerly, that practice exiſting in thoſe parts of the country only, which ſeparate the lands that are generally, or cloſely cultivated, from the mountainous diſtricts, where ſheep-huſbandry, on a large ſcale, and under a regular ſyſtem, is eſtabliſhed.

The common method now uſed, of conveying ſheep dung to the lands in England, is to pen or fold the ſheep themſelves upon it, which on dry friable ſoils in particular, is found to produce beneficial effects. Sheep are ſometimes folded on old paſtures, but more frequently on lands in tillage; eſpecially on fallows, as a preparation for a ſucceeding crop of wheat, and on light ſoils, by way of top-dreſſing after the grain is ſown, or on fields of turnips. This laſt method is more generally adopted, in the incloſed and beſt improved diſtricts. The hurdles, or rails, which form the fold, are commonly about four feet ſix inches long, and three feet ſix inches high, made for the moſt part of hazle. About fourteen or fifteen dozen of theſe hurdles, will incloſe an Engliſh acre. The hurdles are tied to ſtakes, fixed in the ground at regular diſtances, with ſmall branches of trees, twiſted when green for the purpoſe. An acre is conſidered to be a ſpace ſufficient, for folding from twelve

twelve to thirteen hundred ſheep. The ſheep are never allowed to lie above one night on the ſame ſpot of ground; and of courſe, twelve or thirteen hundred will manure an acre of land daily. One or other of the methods above mentioned, of improving land by means of ſheep folding, is very general in England, where every branch of ſheep-huſbandry, on arable lands, is no doubt brought to a great degree of perfection. As ſome proprietors and farmers in ſeveral diſtricts of Scotland are beginning to imitate the Engliſh ſyſtem, by paying proper attention to the improving of the breed of that valuable animal, they will in all probability, ſoon be induced to extend their views, ſo as to connect ſheep-huſbandry with the improvement of the arable lands. This, it is obvious, can be beſt effected, and to the greateſt extent, by introducing the practice of ſheep-folding; which certainly merits the attention of every farmer who is in poſſeſſion of a domeſticated breed of ſheep; and eſpecially of thoſe who occupy dry light ſoils. There, this ſyſtem can be adopted to the greateſt advantage.

Farm-yard Dung.—Farm-yard dung is compoſed of the dung of horſes, cattle and hogs, with urine, ſtraw, and ſome incidental additions; and is both the moſt common and the moſt uſeful manure at preſent uſed in this iſland. From the above deſcription, every ordinary dunghill

dunghill on a farm may be denominated a compoſt, or compound dunghill. Theſe, properly ſo called, are however made up of other materials, and require to be treated of under a ſeparate head.

The preſent mode of managing farm-yard dung, previous to its being laid on the land, is in almoſt every part of theſe kingdoms, where regular farm-buildings have not been erected, extremely negligent and improper, and ſuch as calls loudly for reform. This will appear more eſpecially neceſſary, when we reflect on the ſmall number of farms that are properly accommodated with farm offices, compared with thoſe that are deprived of neceſſary accommodations in this reſpect. We muſt then perceive, that the evil in regard to the miſmanagement of farm-yard dung in Great Britain, is as extenſive as it is ſerious. With the exception of a very few diſtricts, the farms along the weſt and north coaſts of this iſland, from Cornwall to Caithneſs, are deſtitute of proper ſtraw yards, ſheds or houſes ſufficient to contain the cattle; ſo that a great proportion of the dung which, with ſuitable management, would be the means of improving the land, and of courſe, the ſituation and circumſtances of the tenants, is in a great meaſure loſt.

When farm-buildings are without order or connection with each other, as is too generally the

the caſe in the other parts of theſe kingdoms, as well as in thoſe above mentioned, the dung is commonly thrown on ſpaces of ground alotted for the purpoſe, oppoſite to the doors of the ſtables, cow-houſes, &c. where it is allowed careleſsly to remain; its more valuable particles, in the mean while, being exhaled by the influence of the weather, till the return of the ſeaſon, when it is uſually laid on the lands. If the houſes happen to be ſituated on an eminence, the dung lying in ſmall quantities, is drained of all its moiſture. If, on the other hand, they are placed in a hollow, the dung is for the moſt part allowed to remain ſoaked in water. In either caſe, its quality muſt be greatly impaired, and its uſefulneſs in promoting vegetation much leſs, than when, by proper attention, all the eſſence is retained.

The advantages reſulting from well-conſtructed foddering yards are various and important. By means of them, the quantity of dung is much increaſed, and the quality is rendered ſuperior: For theſe reaſons the writer is of opinion, that the advantages of poſſeſſing proper accommodation for the cattle on the farm, are more than ſufficient to counterbalance the expence incurred in erecting them. He feels himſelf warranted to ſtate this opinion, not merely becauſe it is his own, but becauſe it is conſidered as well founded by many intelligent farmers in both kingdoms.

kingdoms, with whom he has converſed on the ſubject. The difference muſt indeed be obvious to every intelligent reader, who is at all acquainted with theſe matters. Where proper houſes, and other accommodations are erected, the dung is collected into one maſs*, the various ſorts carefully mixed together, and the ſuperfluous water carried off by proper drains; by which means the dung retains its properties, and muſt conſequently become uſeful, and its effects conſpicuous, when applied for the purpoſe of invigorating the ſoil. Whereas, when the dung is allowed to remain in ſmall detached looſe heaps, the moſt valuable parts are either drained off, or evaporated; ſo that what remains, is comparatively of little value.

Although it will be readily admitted, that an active and induſtrious farmer, who labours under the inconvenience of having too few farm-houſes, and thoſe improperly ſituated, may, by his ſuperior attention, lay up as great a ſtore of dung, of a good quality, as his leſs aſſiduous neighbour, who is better accommodated as to houſes; yet, whoever makes this the ſubject of general inveſtigation, will find reaſon to be ſatisfied, that on all occaſions where the proprietors, by

* See page 26. of this volume, for a deſcription of a well-conſtructed farm-yard, and the manner of managing dung to the greateſt advantage.

by liberal arrangements with their tenants, afford them the requiſite accommodation for their horſes and cattle, there the farm-yard dung is in general in greater abundance, and of a richer quality.

Farm-yard dung, when applied without mixture of any other ſubſtance, is for the moſt part laid on lands in a courſe of preparation for wheat and turnip crops, although ſometimes on ſuch as are deſigned for barley, or for peaſe; but in this laſt caſe, only when it is intended that the ſucceeding crop ſhould be wheat.

It is impoſſible, owing to the variation in the ſize of the carts in every county, to aſcertain the quantity of farm-yard dung allowed to the acre; but it is probable, that from eighteen to twenty-four cart-loads, each containing from ſixteen to eighteen hundred weight, may be conſidered a fair general average allowance to the Engliſh ſtatute-acre. Several farmers are in the habit of having the dung in the farm-yard turned over, for the purpoſe of bringing it into a ſtate of putreſcence, before it is applied to the land. This is a practice that ought to become more general, as dung in a putrid ſtate muſt have greater and more ſpeedy effects in promoting vegetation, than that which has remained in a cloſe compacted ſtate for ſeveral months.

Street Dung.—This kind of manure, conſiſting chiefly of animal ſubſtances, is held in high eſtimation by all farmers in the neighbourhood of large cities and towns. Street dung is applied to all ſorts of ſoils, and as a preparation for every kind of crop. The ordinary quantity laid on the Engliſh acre, is from ſixteen to twenty loads, of a cart which will contain from twenty-five to twenty-eight buſhels. The very luxuriant and valuable crops that are commonly produced in conſequence of the application of this ſort of manure, has tended of late to raiſe the price to a great degree. This is further augmented in many places, by the abſurd rule eſtabliſhed in ſeveral counties, particularly in Scotland, whereby all carriages loaded with manure, are ſubjected to the payment of toll,—a clauſe, which, it is aſtoniſhing, ſhould ever find its way into an act of Parliament. It is but juſtice, however, to obſerve, that this never happens, but where a low narrow-minded ſyſtem of policy, takes place of one which has for its object the general improvement of the country; and where thoſe intereſted in framing turnpike-acts, pay more attention to *private intereſt than to public good.* For inſtance, at London, Edinburgh, and many other of the principal cities, the farmers are allowed to carry away the ſtreet dung toll free; whereas, at the gates of many towns that are comparatively of little note, no kind

kind of manure is allowed to paſs without payment of toll: And in many caſes, rates amounting almoſt to prohibition are demanded.

SECTION IV.

Compound, or compoſed Dunghills, that is, the Mixture of Manures with different Soils.

EVERY perſon who regards his own intereſt, or the improvement of his farm, will pay proper attention to the means by which he can increaſe the ſize and quality of his dunghills. On theſe, in no ſmall degree, depends the luxuriance of his crops; while he may reſt aſſured, that a decreaſe in the quantity and quality of dung, will have the conſequence of rendering his crops more ſtinted, and leſs valuable. All the Roman writers are particular in their directions for making dunghills. They direct, that the places where they are formed ſhould be made hollow towards the middle, and paved in the bottom with ſtones or bricks, that the moiſture might be thereby more effectually retained. It appears, from various paſſages in thoſe authors, that there were two dunghills belonging to every farm. The one appropriated for receiving the dung from the offices, and the other for preparing it previous to its being carried to the vineyards, and corn fields.

Theſe

Theſe dunghills were alſo uſed as recepticles for all animal and vegetable ſubſtances that could be collected; among which, ſea-weeds, lime, and mud thrown out by rivers, ſeem to have been particular objects of their attention, and were conſidered as valuable articles in the formation of a dunghill. The practice of making compound or compoſed dunghills, or mixens, as they are frequently called, is very common in many of the Engliſh counties. Theſe conſiſt of ſcourings of ditches, ſoil gathered from the ſides of roads, headlands, and furrows drawn to carry off ſuperfluous water, added to dung, lime, chalk, marl, ſea-weeds, ſea-ſand, &c. The ſoil, ſuch as ſcourings of ditches, &c. is commonly collected in autumn or winter, and is turned over once in the courſe of the following ſpring, and again in autumn; when farm-yard dung, together with lime, chalk, or marl, is mixed with it; and at the rate of one cart-load of dung, lime, &c. to four or five of the earth prepared as above mentioned. This compoſt, after being properly mixed, is uſed ſometimes as a top-dreſſing for old paſtures, and meadow lands, and frequently as a preparation for turnips, and other crops. Moſt excellent huſbandry no doubt, and ſuch as muſt always be attended with ſucceſs.

It has been obſerved in a former part of this work, that there is ſcarcely any old incloſed paſture-

paſture-lands in Scotland, except around the proprietors houſes; and alſo, that the ſmall portion of the ground in that kingdom, which is treated as meadow-land, is in a moſt miſerable ſtate of management. From theſe circumſtances, it may be inferred, that the practice of manuring graſs-lands in that part of the iſland is little known; and it is indeed ſcarcely in any inſtance practiſed.

Where the more improved ſyſtems of corn-huſbandry prevail in Scotland, the dung which has been collected in the farm-yard during the preceding winter, is generally carried to the tillage-lands without any other preparation, except being ſometimes turned over, to promote putreſcence. It is, therefore, only in thoſe parts of Scotland, where improvements in agriculture have made little progreſs, that compoſts are moſt frequently made; but as the practice of thoſe diſtricts, in this reſpect, does not merit commendation, nor hold out any incitement for imitation, a minute deſcription is unneceſſary. Theſe compoſts conſiſt either of clay or moſs, although moſt commonly of ſand, with a ſmall portion of dung; which laſt being often allowed to remain expoſed to the influence of the air for months together, as has been already obſerved, it is evident ſuch compoſts can have little effect on the lands to which they are applied.

In

In the few inſtances where compoſts are made by the more intelligent farmers, they are formed of earth and dung; and, lime, marl, or ſea-weed, is added, when theſe can be procured.

The choice of materials, of which compoſts are formed in every diſtrict, where that branch of huſbandry is beſt known, and moſt generally practiſed, depends in a great meaſure on the facility or difficulty of procuring them. One thing, however, is in every farmer's power; and as it is certainly of much importance, ought to be particularly attended to; namely, to ſuit the compoſt to the nature and quality of the ſoil where it is to be applied. For inſtance, if the field on which the compoſt is to be laid, be clay, or ſtrong loam, the earthy part of the compoſt ſhould contain ſand, gravel, chalk, or other light ſubſtances, ſuch as are beſt calculated for ſeparating the particles of thoſe ſtrong and adheſive ſoils. On the contrary, if the field be light and ſandy, the compoſt ſhould be formed chiefly of clay, and other ſoils of a tenacious nature, ſuch as would tend to give a denſity to theſe light friable lands; by which means, more than by any other, their fertility would be moſt effectually promoted.

The moſt approved method of making compoſt dunghills, is to collect the ſcourings of ditches, ſcrapings of roads, or other ſoil that can be procured, and form it into a ridge of about

four or five feet high, and about the ſame breadth at the baſe; in which ſtate, it ought to be allowed to remain ſome months. It ſhould then be turned over and mixed with dung, and lime, marl, or other calcarious ſubſtances, and to the extent before mentioned. Theſe being incorporated together, and improved by fermentation, which always ſucceeds, becomes an excellent compoſt manure, either for tillage or graſs lands.

Having now completed an account of the manures uſed in Great Britain; in which attention has been paid to deſcribe the ſoils to which each ſort is moſt commonly applied; the proper periods of application; the uſual quantities; and, where it could be aſcertained, the expence by the acre; it is further propoſed to give a ſummary of the different kinds uſed in England and Scotland, ſeparately.

ACCOUNT of the Various Manures uſed in each of the two Kingdoms.

Different Sorts of Manures.	Manures uſed in England.	Manures uſed in Scotland.
Lime,	Very generally uſed.	Very generally uſed.
Chalk,	Uſed in the chalk diſtricts.	None in the kingdom.
Marl,	Uſed in ſeveral counties.	Uſed in ſeveral counties.
Shells and ſea-ſand,	Uſed generally on the ſouth and weſt coaſts.	Seldom uſed.
Soapers aſhes,	Frequently uſed.	Little can be procured.
Coal-aſhes,	Uſed near cities.	Never uſed alone.
Peat-aſhes,	Uſed as a top-dreſſing in Berkſhire, &c.	Seldom uſed alone; and never as top-dreſſing.
Soot,	Ditto.	Ditto.
Tanners bark,	Ditto.	Ditto.
Rape-duſt,	Ditto.	Ditto.
Malt-duſt,	Ditto.	Ditto.
Bone-duſt,	Ditto.	Ditto.
Woollen-rags,	Ditto.	Ditto.
Pigeons-dung,	Ditto.	Sometimes uſed as top-dreſſing.
Green crops plough-ed-in,	Inſtances very rare.	Never practiſed.
Sea-weeds,	Generally uſed along the coaſts.	Generally uſed along the coaſts.
Weeds of ponds,	Sometimes uſed.	Little regarded; and ſeldom uſed as manure.
Sheep-dung,	The ſheep folded.	Uſed in compoſt, where the ſheep are houſed.
Farm-yard dung,	Univerſally uſed.	Univerſally uſed.
Compoſts or mixens,	Uſed much as top-dreſſing for meadows and old paſtures.	Uſed in many diſtricts as manure for lands in tillage.

From a peruſal of the above ſtatement, the ſuperior attention of the Engliſh farmers to the proper application of theſe manures, (which, although rich and valuable, can be procured only in ſmall quantities), beyond that of their neighbours in Scotland, is at once diſcernible. There is indeed ſcarcely any branch of huſbandry in which they have ſo evident a ſuperiority as in the

the one now mentioned. The Engliſh farmers living in a populous and great manufacturing kingdom, are no doubt more favourably ſituated for procuring larger quantities of theſe richer manures than can be had in Scotland, except in a few places. At the ſame time, that all the refuſe of the manufactures in the northern kingdom, together with bones, rags, ſoot, bark, &c. ſhould be thrown into the common dunghill, and ſunk in the general maſs, will, by the candid and intelligent, be acknowledged to be a mark of very great inattention. It frequently happens, that farmers, as well as other men, are a long time before they venture on the practice of new experiments. This often ariſes from their being unacquainted with the methods adopted in thoſe diſtricts, whence ſuch practices have been borrowed. If this ſhort account of the kinds and qualities of the manures uſed in Great Britain, and the comparative ſtatement of thoſe uſed in the different kingdoms, can obviate the doubts that any farmers in Scotland may have entertained in regard to the propriety of adopting the practice of top-dreſſing their lands, as a mean of fertilizing them, the deſign is anſwered.

In the preceding part of this chapter, it was mentioned, that we are in a great meaſure ignorant of the manner in which manures operate. It may further be obſerved, that nothing

would contribute more towards determining with preciſion the proper quantities of the different manures that ought to be applied to the various ſoils; the kinds beſt adapted to each ſort of ſoil; or the effects which they produce when applied ſingly, or in a compounded ſtate; than, if a few perſons properly qualified, were appointed by the Board of Agriculture, (and a ſmall ſum of the public money cannot poſſibly be better applied), to make experiments on farms properly ſuited to the purpoſe, in different parts of both kingdoms. Were a few farms regularly cultivated and manured, according to a well choſen and well digeſted plan, and an exact account kept of every occurrence, diſburſement, produce, &c.; ſuch journals, if properly arranged, and regularly publiſhed, would, in the courſe of twenty years, have the effect of reducing the huſbandry of the iſland to ſomething like fixed and certain rules. Such a plan, if properly executed, would tend more to give the practical farmer a clear and comprehenſive idea of the nature, properties, and effects of the various ſorts of manures, than all the experiments of chemiſts, or the reſearches of philoſophers, without practical experience, are able to convey.

CHAP-

CHAPTER XIV.

Culture of the different Kinds of Grain, and the Uſes to which they are generally applied.

CULTIVATING and meliorating the ſoil by labour and manure, ſo as to make it produce vegetables in abundance and perfection, is, ſtrictly ſpeaking, the art of agriculture.

The ancient methods of culture in both kingdoms have already been mentioned, ſo far as appeared either neceſſary or uſeful. Theſe, it is to be regretted, are ſtill too frequently practiſed; but being in a great degree oppoſite to what the writer wiſhes to impreſs on the minds of his fellow-ſubjects, as better calculated to improve the country, and promote the intereſt and happineſs of all concerned in its cultivation, he intends to confine himſelf chiefly to a deſcription of the beſt methods adopted in the various diſtricts where improved agriculture is beſt known. At the ſame time, he propoſes to remark on ſuch, as although improvements on thoſe of former times, are extremely defective

defective in compariſon of the more perfect modes for which ſome particular counties are juſtly celebrated.

Before deſcribing the better methods of culture adopted for raiſing the different crops, it may not be improper to make ſome general obſervations regarding the choice of ſeed, the time of ſowing, the quantity neceſſary, according to the nature of the ſoil, and the ſtate of the weather, the operation of ſowing, &c.

To dwell on the great importance of paying proper attention to the choice of ſeed, would be altogether unneceſſary. The practice of the Britiſh farmers of almoſt all ranks and degrees, ſo far as their knowledge and ſituations afford them opportunities, is ſufficient evidence that there is but one opinion on this ſubject. Beſides the advantages that may be reaſonably expected to reſult from ſowing plump, ſound, healthy grain, in place of what is ſtinted, and which muſt neceſſarily partake of the ſickly nature of the plant which produced it; other circumſtances ought alſo to be attended to in the ſelection.

Some ſeeds of the ſame ſpecies, although of different varieties, are earlier than others, even when ſown on the ſame kind of ſoil, and under the ſame climate; others are more hardy; others more delicate.

Seed

Seed is often changed from cold to warm ſoils, and always with ſucceſs. In this caſe, the plant may be ſaid to have undergone a change from a cold to a more temperate climate; a circumſtance of itſelf almoſt ſufficient to inſure a crop ſuperior, both in quality and quantity, to what could be expected, if ſeed accuſtomed to the ſame ſoil and climate were continued to be ſown for a great number of years.

It is alſo a common and a very proper practice, to change ſeed from early to late ſoils, and from a ſuperior to an inferior climate. From the natural earlineſs of ſuch ſeed, a farmer may delay ſowing his fields for ten or fifteen days, and at the ſame time depend on reaping his crop as ſoon as if he had ſown at the ordinary ſeaſon ſeed that had been long uſed to the ſoil and climate. By changing ſeed from early to late ſoils and climates, a farmer has it frequently in his power to obviate the loſſes and difficulties which otherwiſe are inſeparable from a bad ſeed-ſeaſon. If the weather prove ſo wet and rainy, during the period when he uſually ſows his grain, as to prevent him from doing ſo with propriety, and afterwards becomes favourable, by procuring ſeed that comes ſo much ſooner to maturity, he may be ſaid to have accompliſhed the operations of ſeed-time in due ſeaſon.

There is an advantage reſulting from changing ſeed from ſoils of oppoſite natures, which cannot

cannot be depended on when the change is made from ſimilar ſoils. Some weeds will grow only in ſtrong deep lands, while others are peculiar to light and ſandy ſoils. When, from whatever cauſe, grain abounds ſo much with the ſeeds of weeds, as to render it improper for ſowing, by procuring ſeed from a ſoil of an oppoſite nature, the farmer is to a great degree certain, that no dangerous ſeed-weeds will be introduced by the change.

Grain, like all other ſeeds and plants, when brought from a warmer to a colder climate, gradually degenerates till by being frequently cultivated, it becomes natural both to the ſoil and climate. And it is found from experience, that it degenerates ſooner, and to a greater degree, in mountainous diſtricts, than in the level and better ſheltered parts of the country. At the ſame time, it is well known, that many vegetables introduced from other countries, and which it was once thought would not come to maturity in Great Britain, have, by proper care and attention, been brought to a great degree of perfection. It is ſaid, that ſome of Oliver Cromwell's officers firſt introduced white oats into Scotland. Previous to his over-running that kingdom, (about 150 years ago), the oats generally cultivated in the now highly improved county of Berwick, was of the grey ſpecies, ſuch as are ſtill common in the highland diſtricts. This

This circumſtance, more concluſive than a thouſand arguments, proves how much the quality of grain may be improved by proper attention; and further, that frequent and judicious changes of ſeed are of the greateſt importance in effecting this improvement.

The long and eſtabliſhed practice, and the acknowledged advantages derived from annually importing ſeed-wheat from England, into all the diſtricts in Scotland, where that ſpecies of grain is cultivated, are well known. It is a practice no leſs general, although more local, for the farmers in Banff-ſhire, where deep ſtrong cold ſoils prevail, to procure, in unfavourable ſeaſons, a great portion of the oats neceſſary for ſeed from the light dry ſandy ſoils in the adjoining county of Moray. Were it proper to enter into a particular detail of the practice of other diſtricts where improved agriculture is to any conſiderable degree eſtabliſhed, it would be found that frequent changes of ſeed are, for one or other of the reaſons above mentioned, conſidered not only highly proper, but indiſpenſably neceſſary. As this practice has therefore, from long and extenſive experience, been proved beneficial, it ought to be particularly attended to by the proprietors and farmers of all ranks, in every part of the iſland, where improvements have only been recently, or but partially introduced.

The

The ordinary periods of ſeed-time will be noticed when treating of the culture of each ſort of grain. Here it ſhall only be obſerved, in general, that the goodneſs or badneſs of a crop depends in a great meaſure, on the time of ſowing. Columella remarks very juſtly, and to this effect: "It is an old proverb among huſband-"men, An early ſowing ſometimes deceives, a "late ſowing never, for the crop is always bad." He might alſo have added, that there was an impropriety in ſowing too early. There is a a certain period which every annual plant requires to arrive at its height, and till that happen, its ſeeds cannot be matured. What period the various kinds of grain requires for this purpoſe, remains one of thoſe myſteries in agriculture, which although of great importance to have aſcertained, can at preſent only be gueſſed at from the ordinary ſeaſons in which the ſeed is ſown. Very early ſowing has evidently little effect in producing an early harveſt. Wheat, for inſtance, ſown in November or even in December, is commonly ready for the ſickle, within eight days of that ſown three months before. One bad conſequence of too early ſowing cannot have eſcaped general obſervation; the plants in that caſe grow to a greater height, than when the ſeed is ſown in the ordinary ſeaſon. Early ſowing, therefore, muſt be prejudicial to the crop of grain, as the more nouriſhment

nouriſhment the ſtalks and leaves require, the leſs remains for perfecting the ſeeds, and hence the cauſe why ſo very early ſown crops are ſo often deceitful.

Cato, as well as all the other Roman writers, directs, what every farmer in modern times will find it for his intereſt to introduce into regular practice, *viz.* that lands which are naturally cold, ſhould be firſt ſown, and that ſuch as are light, dry and warm, ſhould be reſerved to the laſt.

The quantity of ſeed ought to be regulated by an attentive conſideration of the following particulars; The nature of the ſoil; the period when ſown; and the ſtate of the weather.

The different ſoils, ſo far as is neceſſary for elucidating this point, may be divided into three ſorts; loam, clay, and light, ſandy, chalky, or gravelly ſoils. In reſpect to the firſt and laſt, a leſs quantity is ſufficient than for the other.

When rich fertile land is reduced to a proper ſtate for receiving the ſeed, if thin ſown, the plants ſpread, a great number often ſpringing from the ſame root, ſo that the crop becomes abundantly thick.

If a large quantity of ſeed is ſown on light ſoils, from theſe not having ſtrength to nouriſh a great number of plants, the ears will be found for the moſt part of a diminutive ſize, and frequently almoſt empty.

In ſtrong wet ſtiff ſoils, unleſs in very favourable ſeaſons, the plants ſeldom ſtock, or branch out from the roots; on which account a greater quantity of ſeed is requiſite, to produce ſuch weighty crops, as ſoil of this deſcription has ſtrength ſufficient for bringing to maturity.

It is very common to ſow a leſs quantity of ſeed in the beginning, than on land of the ſame quality, towards the cloſe of the ſeed-ſeaſon. The reaſon is obvious. Grain ſown early in the ſeaſon, takes deeper root, and has more time to branch out additional ſhoots than what is late ſown, which, when the ſoil is not very free as well as fertile, generally runs up into one ſingle ſtalk, ſo that if a liberal quantity of ſeed be not allowed, the crop, however luxuriant in reſpect to the plants, muſt be ſcanty in the article of grain.

In regulating the quantity of ſeed to be ſown, attention ought alſo to be paid to the ſtate of the weather. In very dry ſeaſons, when the ſoil is in a great meaſure deſtitute of moiſture, the allowance ought to be increaſed, beyond what is neceſſary, when from the ſap contained in the ſoil, there is reaſon to believe that nearly the whole quantity ſown will produce plants. Diſappointment from thin ſowing in dry ſeaſons, and in the warm climate of Italy, was probably the reaſon that firſt induced the Romans to ſteep all their grain before ſowing; and

and no doubt alſo gave riſe to the practice very generally eſtabliſhed in theſe kingdoms, of ſowing the barley-ſeed immediately after a ridge or two is ploughed: A method never thought of in the autumn or early ſpring ſeed-ſeaſons, at which periods there is always more moiſture in the ſoil.

The methods of dibbling and ſetting grain, will fall more properly to be explained, when deſcribing the manner of ſowing with drill-ploughs. The ordinary mode of ſowing, which is termed broad caſt, is performed different ways. That which is moſt commonly practiſed, is to ſow one land, or ridge, (when it is equal in breadth, and not above ſeven yards wide), at once going round, the ſeedſman, or ſower, ſowing one half of the ridge when going, and the other half in returning. Some ſeedſmen fill their hands as they make one ſtep, and ſcatter the ſeed while they make the next. Others ſcatter the ſeed, or make their caſt, as it is technically termed, at every ſtep. Sowing broad caſt, is an operation that no doubt requires great attention, and of which a proper knowledge can only be attained by practice. Yet it is wonderful, with what regularity, on ridges of regular dimenſions, it is generally performed. When theſe are broader at one end than the other, a conſiderable waſte of ſeed is always the conſequence, as the moſt expert ſeedſman, when turning repeatedly on the ſame ridge,

and

and at different parts, cannot poſſibly ſcatter the ſeed with the ſame regularity, as if the ridge was of an equal breadth, ſo that he could regulate his courſe by one particular furrow.

The kinds of grain common in Great Britain, and the particular modes of culture beſtowed on each, with the ordinary ſeed-ſeaſons, the quantity of ſeed, and the returns by the acre, will be found deſcribed in the following ſections:

Section I. The Culture of Wheat, and the Uſes to which it is generally applied.

II. Of Barley.

III. Of Oats.

IV. Of Peaſe.

V. Of Beans.

VI. Of Rye.

SEC.

SECTION I.

The Culture of Wheat, and the Uſes to which it is generally applied.

THERE were only two ſorts of wheat known to the Romans; at leaſt Columella only mentions the common and the bearded kinds; of the former, it is true, he mentions three varieties, and of the latter four. There are ſaid to be twelve or thirteen ſorts in England, and of each ſpecies ſeveral varieties. It is probable, that wheat being generally cultivated in all the various ſoils, and in almoſt all the climates of that kingdom, may have been the cauſe of numerous trifling variations, which thus add ſeemingly, although not in reality, to the liſt of nature's productions. It muſt be acknowledged, that neither ſoil nor climate can have the effect to change red wheat into white, nor ſmooth eared wheat into bearded. At the ſame time, ſoil and climate are well known to have great effects on the quality of grain, and may probably have occaſioned theſe almoſt numberleſs diſtinctions which are now ſo prevalent in almoſt every diſtrict where that ſpecies of grain is generally cultivated. It appears, that wheat had been but very partially cultivated in Scotland before the middle

middle of the fifteenth century, as in the year 1426, it was enacted by the Parliament of that kingdom, that every farmer, ploughing with a team of eight oxen, ſhould ſow at leaſt a firlot, that is, about a buſhel of wheat *.

From there being ſo many various ſorts of wheat known either generally or locally in theſe kingdoms, it is almoſt impoſſible to give any ſatisfactory account of each. It may be ſufficient to obſerve, that the red and white ſorts common in Kent are reckoned the beſt, as producing the whiteſt flour. The bearded wheat, although generally cultivated in many diſtricts where ſtrong wet clay ſoils prevail, is conſidered inferior in quality, and ſells at a ſhilling or two the the quarter under the price of the other ſorts above mentioned; but from its being a more hardy plant, the deficiency in quality is probably fully compenſated when cultivated in ſuch ſoils, by the produce being more abundant.

A ſort known by the name of ſpring-wheat, from its being ſown at that ſeaſon, has been partially introduced; but has not, ſo far as the writer has been able to aſcertain, been generally cultivated in any one diſtrict.

Wheat is more generally ſown after a complete ſummer fallow than on lands in any other ſtate;

* It was at the ſame time enacted, that every farmer of the above deſcription ſhould ſow yearly, half a firlot of peaſe, and forty beans.

ſtate; but a crop of wheat is alſo made to ſucceed clover, peaſe or beans, on many of the beſt cultivated farms.

When wheat is to be ſown on fallow, the land ſhould be firſt ploughed in autumn; a ſecond time, when the barley ſeed-ſeaſon is over, and two or three times, or oftener, afterwards, as circumſtances may render neceſſary. When lime or marl is applied, it ſhould be done in the month of July or beginning of Auguſt. The land ſhould then be ploughed very ſhallow, and before the laſt ploughing for the ſeed is given, farm-yard dung, at the rate of twenty or twenty-five cart-loads, (from 15 to 18 cwt. each), ſhould be allowed to each Engliſh ſtatute-acre. The dung ſhould be ploughed-in as ſoon as poſſible after it is ſpread on the field, and the ſeed ſown with the firſt convenience thereafter.

The above is the mode generally adopted for preparing fallows for wheat, in the Carſe of Gowrie, and in the counties of Northumberland and Berwick, where the proper cultivation of that ſpecies of grain, is *fully as well known*, and the returns by the acre as great, as in any other part of theſe kingdoms.

In many of the open field pariſhes in England, ſeldom more than three ploughings are given to lands in a courſe of ſummer fallow: One in autumn, or early in the ſpring; another during the ſummer; and afterwards the ſeed-furrow.

The

This preparation muſt at once appear extremely defective; as in an ordinary ſeaſon it is ſcarcely poſſible, that, with ſo few ploughings, either the root or ſeed weeds can be completely deſtroyed; and when the ſummer happens to be wet or rainy, the lands under ſuch management muſt certainly be in a very bad ſtate for receiving the ſeed.

When wheat ſucceeds the firſt crop of clover, one ploughing is everywhere conſidered as ſufficient, and is always given immediately before the ordinary ſeed-time. In the counties of Norfolk, Warwick, and ſome others, where the fields are frequently allowed to remain almoſt two ſeaſons under clover, they are broken up about midſummer of the ſecond year, and receive two or three ploughings. It is very doubtful whether this can be conſidered as a real improvement on the ſyſtem laſt mentioned. The favourable climate in theſe diſtricts, compared to that in the weſtern or northern parts of the iſland, it muſt be admitted, gives the farmers in thoſe counties the advantage of reaping conſiderable benefit from the crop of graſs in the early part of the ſeaſon; but if the remainder of the ſummer be not very favourable for cleaning and pulverizing the ſoil, the ſucceeding crop of wheat muſt be inferior to what might be expected, on land newly broken up from graſs of one year's ſtanding. The practice of ſowing wheat

wheat after ſuch preparation, may indeed ſucceed on ſome occaſions, and in particular diſtricts, but in general the experiment will, upon trial, be found unſucceſsful and diſadvantageous;—at leaſt it has often turned out ſo in Scotland.

Wheat is frequently ſown after a crop of peaſe; and this may be done with propriety in thoſe counties, where the harveſt is ſo early as to give the farmer ſufficient time, by repeated ploughings and harrowings, to clean and pulverize the land, before the ſeed is ſown. Where time can only be afforded for giving one ploughing, after the crop of peaſe is removed, before ſowing the ſeed, (as commonly happens in Scotland), ſowing wheat after peaſe muſt be extremely precarious; and, unleſs the land is in a high ſtate of cultivation, there is little reaſon to expect that the crop will be abundant.

Although it is not a general practice, except in ſome parts of Kent, to ſow wheat and beans alternately, for a ſeries of years, yet it is very common occaſionally to ſow wheat after beans. When the beans are ſown in drills, of twenty or thirty inches diſtance, and regularly horſe and hand hoed, as is practiſed in ſeveral counties, the land, from being once ploughed after harveſt, muſt be in excellent tilth, and wheat may be ſown with every probability of ſucceſs.

On thoſe farms, in the ſouthern parts of England, where proper rotations of cropping are eſtabliſhed, and the lands, of courſe, kept always in good order, wheat may be made to ſucceed beans, whether the bean-crop had been horſe-hoed, or ſown broad-caſt; the harveſts being in general ſo early, as to give full time for clearing the field of the weeds and bean-ſtubble, before the wheat ſeed-ſeaſon commences. In Scotland, as well as in thoſe parts of England where the climate is late, and where one ploughing only can be given, cultivating wheat after beans ſown broad-caſt, will be found a hazardous ſyſtem of huſbandry, and one on which no prudent farmer will place his chief dependence.

Wheat is alſo frequently cultivated after hemp, flax, tares, &c. Sometimes only one ploughing is given; but the more general, and undoubtedly the beſt method, is, to give three ploughings, the additional expence of which, will always be fullyr epaid by the abundance of the following crop. When wheat is ſown after a crop of potatoes, one ploughing only is given; and that immediately before the ſeed is ſown.

The wheat ſeed-ſeaſon in Great Britain, may be ſaid to continue four months; it commences about the end of Auguſt, and ends with December. It is however probable, that, between the middle of September, and the end of October, more than four-fifths of the whole is ſown. The difference

difference in ſoil and climate no doubt accounts, in ſome meaſure, for the very long period that elapſes, from the commencement to the concluſion of the wheat ſeed-ſeaſon. One principal reaſon why wheat is ſown ſo late as November and December, is, that a great proportion of what is cultivated in Great Britain, is ſown on lands, whence crops of peaſe, beans, tares, &c. had been reaped; and that when the harveſts are late, it is impoſſible to get the wheat early into the ground. From the generally eſtabliſhed practice of the beſt farmers in every part of theſe kingdoms where wheat is cultivated, it may however be aſſerted, that wheat ſown between the middle of September and the end of October, has the beſt chance of ſucceeding, ſo far as the crop depends on the ſeaſon of ſowing the ſeed.

It was formerly mentioned, that the quantity of ſeed to be ſown, ought to be regulated by a due conſideration of ſeveral circumſtances; as, the periods of ſowing, the nature and condition of the ſoil, &c. In practice, the quantity ſown varies from ſeven pecks, which Mr Marſhall ſays are ſown on the rich lands in Glouceſterſhire, to eleven or twelve, which are frequently ſown on the acre*, in ſeveral counties in England,

* The Engliſh ſtatute-acre is always to be underſtood, unleſs the contrary is particularly mentioned.

land, and generally in Scotland; but on lands in that condition, which warrants the farmer to ſow wheat with a probability of reaping a proper return, the medium quantity may be eſtimated at ten pecks the acre.

When a compariſon is made of the ordinary returns by the acre, with the accounts given both by ſacred and profane writers, of the ſurpriſing crops reaped in ancient times, it naturally excites aſtoniſhment. We are told, that Iſaac, when at Gerar, reaped an hundred-fold, and ſome lands in Egypt, Syria, &c. are ſaid by ancient writers to have been equally productive. Theſe indeed, are acknowledged to have been extraordinary crops, but to the Britiſh farmer they muſt appear altogether wonderful.

The returns of wheat by the acre in Great Britain, in ordinary years, varies between twenty-two and thirty-two buſhels; but, on an average of ſeven years, the medium will ſcarcely amount to twenty-four buſhels, or three quarters the acre. This may be conſidered by ſome as too low an average. It may probably be ſomewhat too low for Scotland, where the beſt lands, and theſe too in high culture, are in general only ſown with wheat. At the ſame time, when it is conſidered, that wheat is frequently cultivated on lands of almoſt every deſcription in England, and after every kind of crop, in ſome counties not even excepting oats,

it will be granted, that if the above general average is miſtated, it is a miſtatement on the ſide of thoſe who would wiſh to have the returns appear more conſiderable than they really are.

Wheat being cultivated almoſt indiſcriminately on all the various ſoils in England, is not only a national loſs, but one of conſiderable magnitude. This ſpecies of grain is well known to ſucceed beſt in deep ſtrong ſoils, made fertile by being well manured. The arrangement muſt therefore be improper, when wheat is introduced into a courſe of cropping on ſandy, gravelly, or chalky ſoils, of the lighteſt nature; a practice common in almoſt every county in that kingdom, where ſuch ſoils prevail. It was formerly remarked how much of the ſucceſs of agriculture depended on properly adapting the mode of cropping to the ſoil. The price of wheat by the quarter is no doubt conſiderably higher than that of any other kind of grain; but if the value of a crop of wheat, by the acre, on ſoils of the deſcription laſt mentioned, is compared with that of barley on ſimilar ſoils, and after the ſame kind of preparation, it will be found in general greatly inferior.

After wheat is ſown, drains and water-furrows ſhould be made in ſuch directions as will moſt eaſily and moſt effectually carry off the ſuperfluous water that would otherwiſe lodge on the fields, and injure the crops in the courſe of the enſuing

enſuing winter. This is a precaution too frequently neglected, and from the want of attention to which, much damage is often ſuſtained. The expence is trifling, compared to the probable advantages to be derived, and ſmall ſums judiciouſly expended in this way, would often ſave many a field of wheat, which, by ill-judged parſimony in theſe articles of expence, is allowed to remain in a great meaſure flooded during ſome of the winter months.

In many parts of England, wheat and other ſorts of grain, are hand-weeded, even when ſown broad-caſt. This practice, although once general in Scotland, is now almoſt everywhere diſuſed. Before the introduction of artificial graſſes into that kingdom; and when the in-fields were kept conſtantly in tillage, thiſtles, as may be ſuppoſed, abounded in every field; theſe were carefully drawn out in the early part of ſummer, by which the double purpoſe of cleaning the fields, and procuring provender for the horſes, before the natural graſſes were in a condition for cutting, was anſwered. Since the introduction of artificial graſſes, the practice of taking out thiſtles, or other weeds, is never attended to; owing to which negligence the crops of grain on many farms are greatly injured. It would therefore be for the intereſt of many Scotch farmers, if they would reſume the practice adopted by their predeceſſors; as although the horſes can now be otherwiſe

otherwiſe provided for, the increaſe of the grain which they might depend on reaping, would do greatly more than defray the expence.

Glouceſter is probably the only county where wheat ſown broad-caſt is hand-hoed. As this practice muſt be in favour not only of the crop of wheat, but alſo of thoſe crops that follow; and as it may be introduced with propriety into thoſe diſtricts where the rate of agricultural labour ſtill continues moderate; it may be proper to mention both the mode of performing the operation, and the expence with which it is attended. When it is propoſed to hoe a field only once in the ſeaſon, (for ſome farmers conſider a ſecond hoeing neceſſary), the operation ſhould be performed towards the end of March, or in the month of April, before the plants get into a vigorous ſtate, after having encountered the ſeverity of the winter ſtorms. When the crop is thin, ſo that the hoe, which is about three inches broad, can be introduced between the plants, the whole ſurface is hoed; but when the crop on parts of the ridges is too cloſe and luxuriant to admit the hoe, ſuch parts are paſſed over.

The ordinary price, for one hoeing, and hand-weeding, which is always performed at the ſame time, is from 2s. 6d. to 3s. the acre.

By this operation, the cruſt that always forms on the ſurface of ſoils, particularly on thoſe of an adheſive nature, is broken, the weeds are either

ther deſtroyed, or retarded in their growth, and the plants enabled to branch out with more freedom. When a crop of wheat is in a languid ſtate in the ſpring, this method of giving new vigour to the plants, eſpecially if followed by a top-dreſſing, and light harrowing or rolling, may be conſidered as the moſt perfect huſbandry, that in ſuch a caſe can be adopted; and which, if generally practiſed, could not fail to add annually many thouſand quarters of that valuable grain to the general ſtock of the country *.

It has become a common practice to ſteep the wheat intended for ſeed, in ſome mixture or other, previous to its being ſown.

The preſcriptions given for ſteeping ſeed-grain with a view of rendering it more prolific, are very numerous. The Romans uſed the lees of oil, decoction of cypreſs-leaves, juice of houſe-leeks, &c. on the virtues of which, they ſeem to have placed great dependence. The ſteeping of wheat is only practiſed in Great Britain, with a view of preventing the crop from being ſmutted. There are two ſteeps commonly uſed. The one is water, ſo ſtrongly impregnated with ſalt, that an egg will ſwim on the ſurface; into this brine the wheat is gently poured, and all the light or diſeaſed grains carefully ſkimmed off. After remaining from twelve to eighteen hours, the brine

* See Marſhall's Rural Oeconomy of Glouceſterſhire.

brine is drained off, and the wheat ſpread in the floor, and then powdered with quicklime, ſo as to make it ſeparate more readily in ſowing. The other method of preparing wheat for ſowing, and which has been attended with great ſucceſs, (as where it is followed, ſmut is ſeldom or never ſeen in the ſucceeding crop), is either to waſh or ſprinkle the ſeed with chamber-lye, and to dry it with lime in the manner above mentioned; but the wheat muſt not be allowed to remain for any conſiderable time covered with the chamber-lye, for twelve or eighteen hours for inſtance, for in that caſe, it will not afterwards vegetate.

It is unneceſſary to mention the various ways in which the flour of wheat is prepared for human food, or that it is the bread-corn uſed by a large majority of the inhabitants of theſe kingdoms. Beſides what is conſumed by the inhabitants conſtantly reſident in the country, as well as by thoſe who carry on our commerce and fight our battles in different parts of the world, nearly one-tenth of all that is cultivated in the iſland is annually uſed for ſeed. Large quantities are alſo uſually converted into ſtarch and hair-powder; and as theſe articles are taxed to a conſiderable extent, the revenue of the State is to a certain degree augmented by the cultivation of this ſpecies of grain.

SECTION II.

The Culture of Barley, and the Uſes to which it is generally applied.

THERE are four diſtinct ſorts of barley known in theſe kingdoms: The ſpring barley; the long eared barley; the ſprat barley; and the ſquare bear-barley, or big. The firſt and laſt are more generally cultivated than the others: The ſpring barley in the ſouthern and eaſtern parts of both kingdoms, and the bear-barley, or big, in the north-weſt of England, and in the northern and highland diſtricts of Scotland. The long eared barley is common in ſome Engliſh counties; but owing to the length and weight of its ears it often lodges, which renders a crop of this ſpecies more precarious than one of common ſpring barley. The ſprat barley has ſhorter and broader ears than any of the other ſorts: it is more generally known by the names of Battledore and Fulham barley, being cultivated in the neighbourhood of theſe places to a greater extent than in any other part of England, for in Scotland it is ſcarcely known.

Barley being the grain next in value to wheat, is very generally cultivated. Dry, light, mellow

ſoils

ſoils produce the thinneſt rinded and largeſt bodied barley, which is always eſteemed the beſt in quality. Even light poor ſoils, when dry, and both from nature and ſituation warm, will yield barley ſuperior in quality to what is commonly reaped from the ſtrongeſt land when cold or wet.

Barley is ſown after every kind of crop, but always ſucceeds beſt after turnips, peaſe, beans, or others of an ameliorating nature.

When barley ſucceeds turnips, the land is ſometimes only once ploughed, but the more approved method is to plough it twice. Firſt, early in ſpring, and again before ſowing the ſeed. This laſt is the practice in Norfolk, where that ſpecies of grain is cultivated in a more perfect manner, and to a greater extent, after turnips, than in any other county in Great Britain.

When barley is ſown after peaſe, or beans, or oats, the land is firſt ploughed in autumn; and the attentive farmer always takes care on this occaſion, to plough in ſuch a manner, as to expoſe as great an extent of ſurface to the influence of the air and froſt as poſſible; and at the ſame time, ſo to form the ridges, as to prevent the field from receiving any damage from exceſſive rains during winter. The ſecond ploughing, in Scotland called the *ſteering* furrow, is given immediately after the oat-ſeed is finiſhed. This ploughing is intended to anſwer

two

two purpoſes. In the firſt place, to looſen the couchgraſs, and other root-weeds; ſo that they may be eaſily taken out by the harrows, which are immediately afterwards applied; and, in the ſecond place, to reduce the ſoil to a finer tilth, whereby the ſeed-weeds are encouraged to vegetate, and which the ſubſequent ploughing and harrowing at ſeed-time, effectually deſtroys.

Barley is frequently ſown after wheat, when the ſame mode of culture as laſt mentioned is adopted. This rotation of cropping is pretty common in various parts of theſe kingdoms, although there appears no ſufficient reaſon why it ſhould be recommended to general notice. Two white-corn crops ſucceeding each other, is an erroneous method, either for profit or improvement. Beſides, where the writer has had occaſion moſt frequently to ſee barley ſucceed wheat, he has uniformly obſerved the barley crop to a certain extent blighted; many of the ſtalks became white in the month of July; and if there were any grains in the ears, theſe were ſhriveled, and never came to maturity; while at the ſame time the ſoil, a dry deep hazle-coloured loam on a rocky bottom, was admirably adapted for the production of that grain, in plenty and perfection.

In ſeveral diſtricts of both kingdoms, where no proper rotations of cropping have been introduced, or rather where the barbarous ſyſtem of

of oats, oats, oats in ſucceſſion for a number of years, ſtill prevails, the land is generally manured for a crop of barley, and the cleaning it of weeds, an arduous taſk, and often very ſlovenly performed, gives full employment to all the hands on the farm for a conſiderable period.

The barley ſeed-ſeaſon commences in ſome of the ſouthern counties in England, as Middleſex, Surry, Berks, &c. about the firſt week of March, and terminates, in Sutherland, Caithneſs, and Orkney, towards the middle of June. From the middle of March to the end of April, may be reckoned the chief barley ſeed-ſeaſon in Great Britain; as within theſe periods, by much the greateſt proportion of that ſpecies of grain is ſown.

The quantity of ſeed-barley allowed to the acre, varies very much; and depends not only on the circumſtances formerly mentioned, but on what was the preceding crop, and alſo on the condition of the land at the time of ſowing. When barley ſucceeds turnips, the land being then in the beſt poſſible condition for receiving the ſeed, a leſs quantity is neceſſary, than if it were to be ſown after two or three ſucceſſive white-corn crops. The uſual allowance to the acre, is from three buſhels and a half to five; but four buſhels and a peck may be conſidered as the general average; ſo large a quantity

as five buſhels being never ſown, but on lands exhauſted and worn out with over-cropping.

If a ſtatement of the average-returns of barley by the acre, was confined to England and the ſouth of Scotland, it might be rated at thirty-two buſhels, but when Wales, and the north of Scotland, is included, where, owing to the imperfect modes of culture ſtill practiſed, the crops are very indifferent; the general average over the whole, will not probably exceed twenty-eight buſhels the acre.

Barley is applied to various uſes. In Wales, Weſtmoreland, Cumberland, and in the north, as well as in ſeveral parts of the weſt of Scotland, the bread uſed by the great body of the inhabitants, is made chiefly from barley. Large quantities of the barley cultivated in England, are converted into beer, ale, porter, and what is called Britiſh ſpirits, as Engliſh gin, Engliſh brandy, &c. The remainder, beyond what is neceſſary for ſeed, is made into meal, and partly conſumed in bread by the inhabitants of the above-mentioned diſtricts, or uſed for the purpoſe of fattening black-cattle, hogs, and poultry. There is a much greater ſhare of the Scotch barley conſumed in diſtillation, than, in proportion to the quantity cultivated, there is in England. Excluſive of what is uſed for ſeed, the Scotch barley is either converted into beer or ale; or made into pot-barley, or into meal, for the uſe of the inhabitants

inhabitants in the more remote and leſs cultivated parts of the kingdom; or, laſtly, into whiſky.

The malt-tax, and the exciſe on beer, ale, porter, and Britiſh ſpirits, form together a very conſiderable branch of the revenue of the State; and render the cultivation of barley, in a national point of view, more beneficial than that of any other grain.

Some very ſucceſsful attempts have been lately made, to eſtabliſh porter-breweries in ſeveral parts of Scotland. Theſe, with a ſmall ſhare of indulgence from the Legiſlature, would in all probability ſoon have the effect of introducing generally, the uſe of that wholeſome beverage, in place of *whiſky*, that baneful liquor, which has proved no leſs fatal to the morals, than to the conſtitutions, of many of the Scotch peaſantry. This is a truth that every perſon may be ſatisfied of, who will take the trouble to peruſe the Statiſtical Accounts, publiſhed by Sir John Sinclair, where they will find the fact corroborated, by the united teſtimony of a great proportion of that reſpectable body of men, the clergy of the Church of Scotland. There it will be found ſtated as an evil of ſuch magnitude, that if it could be removed by a trifling and temporary ſacrifice of the public revenue, ſuch a meaſure would meet the general approbation of every friend to mankind.

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SECTION III.

The Culture of Oats, and the Uſes to which that Species of Grain is generally applied.

THERE are oats of four different colours cultivated in this iſland: The white, the black, the grey, and the brown or red. The white is the moſt common; all the others being only locally cultivated. Black oats are partially cultivated in ſeveral counties in both kingdoms; and are reckoned very good for feeding horſes, to which uſe they are for the moſt part applied. The cultivation of the grey ſort is now confined to the highland and mountainous diſtricts; particularly to thoſe in the north of Scotland. The brown or red oats, are much cultivated in the counties of Stafford, Derby, and Cheſter; and have been lately introduced into thoſe of Inverneſs, Roſs, Sutherland, and Caithneſs, where, from their being an early, and a very hardy ſort, it is highly probable the introduction of them will prove an eſſential advantage. This kind is much eſteemed in the higher parts of the counties of Northumberland, Berwick, Roxburgh, &c. where it is found not only to meal well, but alſo to ripen at leaſt a fortnight before

any

any other. This laſt-mentioned quality ought to be a powerful inducement with the proprietors and farmers, in theſe northern diſtricts, to introduce the general cultivation of this ſpecies of oats; eſpecially, conſidering the precarioufneſs of the harveſts, even in ordinary ſeaſons.

There are many varieties of the white oats, beſides the Dutch, the Poliſh, and the Tartarian; all of which are cultivated to a conſiderable extent in particular diſtricts.

All ſorts of oats are hardy, and thrive in any ſoil. This is probably the only reaſon that can be aſſigned, why leſs attention is beſtowed in preparing the land for a crop of oats, than for any other kind of grain.

Although oats are ſown on every ſort of ſoil in Great Britain, capable of producing grain, yet, from the weighty crops commonly reaped from thoſe of a ſtrong and rather adheſive nature, it is evident they are better adapted to ſuch ſoils, than to thoſe of a lighter texture.

Whatever may have been the previous crop, (for oats are ſown after all crops), there are few inſtances where more than one clean furrow is given. In many parts of Scotland, and in ſome counties in England, it is indeed a common practice, to, what in Scotland is called, rib-furrow, and in Norfolk ſlob-furrow *, a field in autumn, in

* This manner of ploughing is performed, by turning over the furrows, at from twelve to eighteen inches diſtant

which it is propoſed to ſow oats the following ſeaſon. When this operation is performed in the autumn, the land is well harrowed in the ſpring; and receives a thorough ploughing before the ſeed is ſown.

When one furrow only is given, it is done either during winter, or in the ſpring, as happens to be moſt convenient; the general practice in this reſpect depending more on the ſtate of the weather, than on any rule which the farmers preſcribe to themſelves.

Wherever improved agriculture is eſtabliſhed, oats are for the moſt part cultivated on lands newly broken up from graſs. The great returns that are commonly reaped, prove, in the moſt ſatisfactory manner, the correctneſs of this method, which therefore can neither be too ſtrongly recommended, nor too generally adopted. In regard to the very general practice ſtill purſued in ſome counties, of ſowing oats after oats, in ſucceſſion, for ſeveral years, it is juſtly reprobated by every intelligent farmer, and ought to be univerſally exploded.

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diſtant from each other. By this means, one half of the ſurface remains untouched by the plough; and the furrow being thrown off the mould-board, on the unbroken ground, a great extent of ſurface is thereby expoſed to the influence of the weather during winter; by which means it is much benefited, while the root-weeds are deſtroyed.

The ſowing of oats commences, in ſome of the ſouthern counties of England, in the end of February, and is ſeldom finiſhed in the northern diſtricts of Scotland, till towards the middle of April; but in both kingdoms, the month of March may be conſidered the general oat ſeed-ſeaſon.

The quantity of ſeed ſown, depends, in a great meaſure, on the ſtate of the land. When it is exhauſted and worn out with over-cropping, the common practice is, to ſow a much greater quantity than is deemed neceſſary when, from previous good cultivation, and gentle treatment, it is more likely to produce an abundant crop. The variation extends from four buſhels, to upwards of ſix; but five may be ſtated as the medium quantity allowed to an Engliſh ſtatute acre in both kingdoms.

Oats being ſown on all ſorts of ſoils, and too frequently on lands in extreme bad order, it becomes very difficult to form a juſt opinion, in regard to the general average-returns by the acre. In Eſſex, Lincolnſhire, the North Riding of Yorkſhire, the Carſe of Gowrie, and in ſeveral other well-cultivated diſtricts, and where ſtrong deep ſoils prevail, eight, and ſometimes ten quarters, although not ordinary crops, have frequently been reaped; whereas in many extenſive diſtricts, particularly in the mountainous diſtricts of Scotland and Wales, twenty buſhels

the

the acre, may be reckoned rather more than the average crop. Making a general eſtimate of the annual produce of every acre ſown with oats in theſe kingdoms, thirty buſhels may be accounted a fair medium.

Oats are applied chiefly to two uſes in theſe kingdoms. In Scotland, and in ſeveral counties in the weſt of England, a great proportion of the crop is converted into meal, and conſtitutes the principal part of the food of the common people. The remainder, amounting probably to two-thirds of the whole, after deducting one-ſixth for ſeed, is conſumed in feeding horſes.

Thoſe who have turned their attention to the conſideration of the quantity of corn, chiefly oats conſumed annually by farm-horſes in theſe kingdoms, muſt be aſtoniſhed that the farmers have not more generally adopted the plan of feeding their working-cattle, whether horſes or oxen, with green crops, as potatoes, carrots, &c. in place of conſuming ſo much of their grain in that way.—The alteration would be no leſs profitable to themſelves, than advantageous to the community at large.

SECTION IV.

The Culture of Peaſe, and the Uſes to which that ſpecies of Grain is generally applied.

THERE are two varieties of peaſe generally cultivated in the fields, the one denominated the early or hot, and the other the late or cold ſeed. A crop of peaſe is not only more precarious, but when tolerably abundant, leſs valuable, than any other ſort of grain. Were it not that the haulm or ſtraw of peaſe is valuable, as being ſweet and nouriſhing food for horſes, cattle, &c. and that a crop of peaſe, when it ſucceeds, tends greatly to meliorate and improve the ſoil, it is not probable that a great proportion of the lands of Great Britain would be devoted to the cultivation of this ſpecies of grain.

Peaſe are ſown on almoſt all ſorts of ſoils, but ſucceed beſt on ſuch as are of a moderately light and friable nature, eſpecially if lime, chalk, or marl, has been previouſly applied; in which caſe, in ordinary ſeaſons, a crop of peaſe ſeldom or never miſgives.

Peaſe are commonly ſown after a crop of wheat, or oats, but not unfrequently on lands exhauſted

exhauſted and run out with over-cropping. There are very few inſtances, where more than one ploughing is given. It is generally performed in the ſpring, immediately before the ſeed-ſeaſon commences.

The quantity of ſeed to be ſown, depends much on what is the chief deſign in view by cultivating this ſpecies of grain. When peaſe are ſown for the purpoſe principally of producing a luxuriant crop of ſtraw, and thereby meliorating and enriching the ſoil, a greater quantity of ſeed ſhould be allowed, than when a crop of corn is the chief object; as there is thereby a greater chance that the crop will fully cover the ſurface, and ſmother and deſtroy ſuch weeds as may be in the land. When a crop of corn is chiefly in view, leſs ſeed ſhould be ſown; becauſe a free circulation of air, which is eſſentially neceſſary to the production of an abundant crop of peaſe, is by that means more effectually ſecured.

Peaſe are ſown from the end of February to the middle of April; but the firſt fortnight of March is the ordinary period for ſowing the late ſort, and the end of March, or beginning of April, the other.

For the reaſons above mentioned, the quantity of ſeed ſown on the acre varies conſiderably, not leſs than from three to upwards of five buſhels. When the land is in tolerable condition,

four

four buſhels are ſufficient; and this may be conſidered the ordinary general allowance.

If the annual average-returns of peaſe could be as accurately aſcertained, as the prices at which that ſpecies of grain is ſold, it would be found, that the crop is leſs valuable, if the value of the grain is ſingly conſidered, than any other which is cultivated. Crops of peaſe frequently vary from under ten to upwards of forty buſhels the acre. It is highly probable, that twelve buſhels may be about the general average-return by the acre, for any period of ten years taken together.

In ſome parts of Scotland, peaſe are mixed with barley, and converted into meal for the labouring people; but this practice is wearing greatly out, oat-meal being now much more generally uſed than at any former period. From the very low average-return above ſtated, and the quantity of ſeed ſown on the acre, it will be obſerved, that a great part of the produce is neceſſary for ſeed; the remainder is applied to fatten hogs, conſiderable quantities being annually exported from Scotland to London, Hampſhire, and other places, which are applied entirely to that uſe, or given to horſes, in place of oats; neither of which modes of uſing peaſe has yet become general north of the Tweed.

SECTION V.

The Culture of Beans, and the Uſes to which they are generally applied.

THE ſpecies moſt commonly cultivated in the field, is known by the name of the horſe-bean. Beans prefer a ſtrong moiſt ſoil; and when proper culture is beſtowed, abundant crops are gerally reaped.

Beans and peaſe are frequently cultivated together; but whether ſown alone, or mixed with peaſe, it is commonly after wheat or oats; although in ſome counties in England beans are ſown on lands freſh broken up from graſs; a method hitherto unpractiſed in Scotland.

Peaſe and beans generally ſucceed very well when ſown together; the ſame culture anſwers for both, they ripen equally, and are in general applied to the ſame uſes.

The ordinary mode of preparing land for a crop of beans, is to give one ploughing only, which is generally performed in the ſpring immediately before the ſeed is ſown. Beans are for the moſt part ſown broad-caſt, either on the ſtubble, before ploughing, or on the new-turned-up furrows,

furrows. Sometimes beans are ſown or planted in the bottom of every ſecond or third furrow, and afterwards horſe and hand hoed. In a few diſtricts, they are ſown with a drill-machine, and at ſuch diſtances in the rows as to leave ſufficient ſpace, either for hand-hoeing, when that only is intended, or for horſe and hand hoeing, when it is propoſed that both theſe operations ſhould be performed. It will at once appear obvious, that either of theſe laſt-mentioned methods are preferable to ſowing the ſeed broad-caſt, as an opportunity is not only afforded of cleaning the ground properly, but a more abundant return, and grain of ſuperior quality, are alſo thereby inſured.

The ſpring ſeed-time in general commences with the ſowing of beans. In the ſouthern diſtricts, beans are ſown, in ordinary ſeaſons, ſo early as the middle, or towards the end of February; and in the northern parts of Scotland, ſo late as the beginning of April. The month of March may however be conſidered as the general bean ſeed-ſeaſon.

When beans are ſown broad-caſt, from three to ſix buſhels the acre, are commonly allowed. The ordinary quantity may be reckoned at four buſhels and a half; but as planting with the hand, as well as drilling and ſowing in every ſecond or third furrow, is frequently practiſed, and in various diſtricts, leſs ſeed is requiſite, it is pro-

bable that four buſhels ought to be conſidered as the general average quantity of ſeed-beans allowed to the acre over theſe kingdoms at large.

The returns by the acre are not ſo fluctuating as thoſe of peaſe, and owing to the ſuperior culture that is commonly beſtowed, they are upon the whole, conſiderably more abundant.

A crop of beans may, taking the iſland at large, be ſuppoſed to vary from ſixteen to forty buſhels, but a good average-crop cannot be reckoned to exceed twenty.

A correſpondent, in the Muſeum Ruſticum *, directs, that as ſoon as beans have got ſix leaves, ſheep ſhould be turned in to feed among them, as they would eat up all the young weeds without touching the beans; and adds, that this practice may be continued till the beans are in bloſſom, without injuring the crop, provided the ſheep are prevented from lying down among them. The writer of theſe ſheets had occaſion to ſee this ſeemingly extraordinary advice carried into practice in an open field pariſh near Wellingborough in Northamptonſhire, and was aſtoniſhed at the ſucceſs with which it was attended. The field was extremely free of weeds, nor could any conſiderable damage be obſerved done to the crop, either by the ſheep eating the plants of beans, or by their breaking or treading them down. When ſheep that were conſtantly kept at ſhort allowance

* Vol. iii. page 339.

allowance on the commons of an open-field pariſh, did ſo little damage, it may be ſuppoſed that thoſe commonly kept on rich incloſed paſtures would do ſtill leſs.

The crops of beans in both kingdoms are chiefly conſumed in feeding horſes; but as it is not common to feed farm-horſes with beans in Scotland, the ſurplus, after reſerving the quantity neceſſary for ſeed, is for the moſt part ſent to England, and there uſed in the manner now mentioned. When peaſe and beans are cultivated together, the crop is applied either for feeding horſes, or for fattening hogs.

When the proportion of peaſe is greateſt, the mixture is reckoned beſt for hogs; but when beans preponderate, it is uſed for feeding horſes. It was formerly a very common practice in Scotland, to make meal of peaſe and beans, and to convert it into bread for the uſe of the ſervants and labouring people; but the quantity now uſed in this way is comparatively very ſmall.

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SECTION VI.

The Culture of Rye, and the Uſes to which that Grain is generally applied.

THE cultivation of rye, as ſpring food for ſheep, a mode of huſbandry frequently practiſed in England, will fall more properly to be taken notice of in the following chapter, when deſcribing the various ſorts of green crops cultivated in both kingdoms, and the uſes to which they are applied.

There are two varieties of this ſpecies of grain, the one diſtinguiſhed by the name of winter, and the other of ſpring rye.

Rye is the hardieſt grain cultivated in Great Britain. When ſown in autumn, it is ſeldom or never materially injured by the ſevereſt winter; it is more forward in the ſpring than wheat; and although a leſs profitable, is a more certain crop.

Rye ſucceeds beſt in dry light ſandy ſoils; there are indeed few ſoils ſo light or poor, as to be incapable of producing tolerable crops of rye. In Herefordſhire, there is an extenſive tract of very poor land denominated *rye-land*, from an opinion

opinion that long prevailed, although now proved to have been ill-founded, that the ſoil was incapable of producing any other grain.

The cultivation of rye was very general in ſome parts of Scotland, about twenty-five or thirty years ago; but ſince that period, has gradually declined, in ſo much, that a field of any extent, except in two or three of the ſouthern counties, is ſcarcely any where to be ſeen in that kingdom. It was a very common practice, when rye was cultivated in North Britain, and when ſown in the ſpring, to mix peaſe with it, and ſometimes oats. The ſame practice, with a difference in regard to the ſpecies of grain, and the time of ſowing, is ſtill common in the north of England, where rye is frequently cultivated. There, rye and wheat are uſually ſown together. It is almoſt unneceſſary to mention, that this practice is founded on error. Every year's experience muſt prove, that rye is ready for reaping before wheat, or any other kind of grain; and of courſe, when rye and wheat are cultivated together, much loſs and inconvenience muſt neceſſarily enſue. If, in order to make wholeſome, nutritive, and at the ſame time a cheap ſort of houſehold-bread, it is judged proper to mix ſeveral ſorts of grain; this can certainly be as well done, and in more exact proportions, in the barn than in the field: Beſides, as wheat does not ſucceed in that ſort of ſoil,

which

which long experience has proved to be moſt favourable for producing good crops of rye, the impropriety of ſowing theſe two kinds of grain together, becomes more evident.

Rye is ſown after turnips, clover, and peaſe, and frequently on lands that have undergone a complete ſummer-fallow. The ſeed-time may be ſaid to continue from the beginning of October to the middle of March, it being common to ſow rye at any time during winter, when the weather happens to be good, and the land in proper condition.

The uſual allowance of ſeed is about three buſhels to the acre, and the produce, conſidering ſuch preparation as is generally beſtowed on the land, may be eſtimated at twenty-four buſhels, or three quarters the acre.

In the north, and in ſome parts of the weſt of England, and alſo in Wales, rye, with a mixture generally of ſome other grain, is made into meal for the uſe of the peaſantry. Large quantities of rye are alſo uſed in the diſtilleries about London, and ſome thouſand quarters are annually mixed with wheat, converted into meal, and uſed as bread in that city and neighbourhood.

The following table will ſhow at one view, the value of the returns of the different kinds of grain cultivated in theſe kingdoms, taking it for granted, that the averages above ſtated are accurate.

TABLE

TABLE of the Average-Returns by the Engliſh and Scotch Acre, of the various kinds of Grain, cultivated in GREAT BRITAIN, with the Value thereof in Money, at the rates *per* quarter therein ſtated.

Kinds of Grain.	Quantities by the Engliſh acre in buſhels.	The ſame quantity converted into bolls, firlots, &c. by the Scotch acre.				Price *per* Quarter.	Value of the crop by the Engliſh acre.			Value of the crop by the Scotch acre.		
		B.	F.	P.	L.							
Wheat,	24	7	1	0	2	42 s.	L.	6	6	L. 8	0	1
Barley,	28	5	3	3	1	24 s.		4	4	5	6	9
Oats,	30	6	1	2	1	20 s.		3	15	4	15	4
Peaſe,	12	3	2	2	1	26 s.		1	19	2	9	6
Beans,	20	6	0	1	0	26 s.		3	5	4	2	7
Rye,	24	7	1	0	2	26 s.		3	18	4	19	0
Divide by 6,	138	36	2	1	3		L.	23	7	L. 29	13	3
General average by the acre,	23	6	0	1	2½		L.	3	17	10	L. 4	18	10½

It may be agreeable to many readers, to ha
ſome data laid down, by way of appendix to t
preceding account, on which a calculation mig
be formed of the expence attending the cul
vation of a farm, the principal part of which
devoted to corn-huſbandry.

The writer having been employed by t
Board of Agriculture, to make a report of th
preſent ſtate of huſbandry in the Carſe
Gowrie, was on that occaſion favoured with
account of the total expence attending the cu
tivation of a particular farm in that diſtrict,
a conſiderable period. That account having
been made out, from books kept by a very reſpect-
able and accurate farmer, the peruſal of it can-
not fail to be agreeable to ſuch readers as would
wiſh to compare the expence of cultivation with
the value of the returns. It may at the ſame
time prove uſeful, not only as a general rule
whereby every farmer may form a comparativ
ſtatement between the expence of management
and the value of the produce that he can carry
to market, but alſo as a guide in claſſing an
arranging the various articles of the expence o
cultivation under proper heads. An importan
matter, but in regard to which, it will be ac
knowledged, too many Britiſh farmers are de
ficient. For theſe reaſons, a copy is here an
nexed.

STAT

STATE of the Annual Expence neceſſarily laid (20th July 1787, and ending at 20th July 1793

Years.	Rent.	Seeds of corn and graſs.			Servants Wages. Farm ſervants.			Shearers.			R
		L.	S.	D.	L.	S.	D.	L.	S.	D.	
1788		196	3	6	81	10	0	34	14	0	5
1789		203	2	4	77	10	8	36	4	7½	5
1790		237	1	6	94	11	8	40	14	4½	8
1791		229	1	1	77	19	0	37	3	11	8
1792		213	11	10	83	10	6	43	17	0	7
1793		253	1	10	72	16	6	48	15	2	7
Div. by 6,		1332	2	1	487	18	4	241	9	1	51
gen. aver.		222	4	1⅓	81	6	4⅔	40	4	10	8

As the rent of any particular farm would not apply to the

The annual expence of the farm, on an average of ſix years each Scotch acre, or L. 1, 18 s. the Engliſh acre.

The charge made for the maintenance of the farm-horſes, is and annual repairs.

Petty diſburſements comprehend the expence of harveſt beer,

N. B. The Scotch acre contains 6150 ſquare yards, and th

CHAPTER XV.

The Culture of Green Crops, and the Uſes to which they are generally applied.

GREEN crops,—that is, turnips, potatoes, &c. may be ſaid to have been but recently introduced into Great Britain; at leaſt the cultivation of them, as food for live ſtock, has become general only ſince the middle of the preſent century.

It is propoſed, in this chapter, to give an account of all the roots and plants cultivated in theſe kingdoms, as winter and ſpring food for horſes, cattle, and ſheep; and at the ſame time to take notice of the beſt means of preſerving them during winter, and of the moſt advantageous methods of giving them to thoſe live ſtock, for which they are known to be beſt adapted.

The different ſorts of green crops will be found claſſed, and the proper modes of culture deſcribed, in the following order, *viz.*

Section I. The Culture of Turnips, and the Uſes to which they are generally applied.

II. Of Potatoes.

III. Of Carrots.

IV. Of Cabbages.

V. Of Tares, or Vetches.

VI. Of Rape, or Cole, and of Rye, as Winter and Spring Food for Sheep.

SEC-

SECTION I.

The Culture of Turnips, and the Uſes to which they are generally applied.

It is not many years ſince the culture of turnips in the fields became common, even in England. How the introduction of this very uſeful root into that kingdom was ſo long delayed, may not be eaſy to determine. It is evident that turnip-huſbandry was known to the Romans; as ſome of their agricultural writers, in treating of the different kinds of vegetables proper for the field, recommend the uſe of *rapa*, or turnip, in plenty; becauſe, ſay they, the roots which are not wanted for the table, will be eaten by the cattle. Columella alſo mentions turnips as having, in his time, been generally cultivated in Gaul. To ſome proprietors and farmers in Norfolk, the merit of firſt cultivating turnips in the field in this country is to be aſcribed. The introduction of this now ſo important branch of huſbandry, is ſaid, in the Agricultural Report for Norfolk, to have taken place in the reign of George I. and owing to the following circumſtance: The then Lord Viſcount Townſend, grandfather of the preſent Marquis, having attended the King to Hanover, had there an opportunity of being

fully acquainted with the various advantages derived from the general cultivation of that root. On his return to England, he brought ſome turnip-ſeed along with him; and having recommended the introduction of turnip-field huſbandry to his neighbours and tenants in Norfolk, as a ſure mean, whereby they could promote the improvement of the county, and their own intereſt, many of them were induced to make experiments, by ſowing ſmall quantities. Theſe experiments having, in every inſtance, ſucceeded, the practice of ſowing turnips gradually gained ground in that diſtrict; and in the courſe of the laſt ſeventy years, has become common in almoſt every part of Great Britain.

As the cultivation of turnips in the field, has been longer practiſed, and the method ſtill as well, if not better underſtood in Norfolk, than in any other county in theſe kingdoms, it may be proper, in deſcribing the moſt approved culture, to keep chiefly in view the general mode of management adopted there.

There are four ſorts of turnip-ſeed ſown in Norfolk; the common white, the green, the purple-topped, and the pudding. The three firſt differ more in colour than in ſhape, or in any other particular. The laſt, or pudding-turnip, in place of being round, or ſpreading flat on the ground, as the others do, takes more of a cylindrical form; and as the greateſt part of the root, when full

full grown, ſtands expoſed to the influence of the froſt, (a ſmall proportion only being covered by the ſurface-mould), this kind is found ill adapted for ſtanding over winter. The common white being a more hardy ſort than any of the others, is on that account moſt generally cultivated, not only in Norfolk, but alſo in every other diſtrict where turnip-huſbandry is eſtabliſhed.

Turnips thrive beſt in a light, loamy, or ſandy ſoil; but the goodneſs of the crop depends more on the open friable nature of the ſoil, and its being well pulverized, than on its richneſs. Marl or lime operate powerfully in producing good crops of turnips. The former is applied with great ſucceſs in Norfolk, Angus, and ſeveral other counties, and lime, with no leſs advantage, in every diſtrict where that kind of manure can be procured.

Turnips ſeldom ſucceed any other crops than wheat, barley, or oats, although in ſome counties in England they are made to ſucceed peaſe.

In Norfolk, the land is never leſs than four, and frequently five times ploughed previous to ſowing the turnip-ſeed. The firſt ploughing is given towards the end of the year, the ſecond after the barley ſeed-ſeaſon is over, and two or three afterwards, as the ſituation of the land and other circumſtances render neceſſary or practicable. The dung is commonly applied after the third ploughing and harrowing, and from twelve

twelve to twenty cart-loads of the ordinary ſize uſed in that diſtrict, are conſidered as fully ſufficient for an acre.

The period of ſowing is regulated by the deſign the farmer has in view, in regard to the application of the crop. When it is intended for early conſumption, the ſeed is ſown about the ſecond week of June; but if it be intended as ſpring food for cattle or ſheep, the ſowing does not commence till the firſt or ſecond week of July. The principal turnip ſeed-ſeaſon in Great Britain may be reckoned from the 15th to the 25th of June; when turnips are ſown later in Scotland, the crop is ſeldom abundant.

The common method of ſowing in Norfolk, and in all the ſouthern counties of England, is broad-caſt, and in the north of England, and all over Scotland, by the drill-plough, and in rows at the diſtance of twenty-four or thirty inches, aſunder. In the former caſe, the crop is repeatedly hand-hoed, in the latter, both horſe and hand hoed. The practice of hoeing crops of turnip is univerſal in Scotland, and in the north and eaſt of England; but in the counties of Bedford, Lancaſter, Cornwall, &c. this neceſſary operation is ſeldom performed. By this groſs inattention to the eſtabliſhed rules of good turnip-huſbandry, ſuch a quantity of weeds gets up, as in a great meaſure ruins the turnips, and beſides, by thus encouraging weeds, the ſucceeding

ceeding crops are rendered poor and trifling. In ſome diſtricts, from ſuch miſmanagement, a crop of turnips is reckoned a loſs rather than an advantage. This is particularly remarked in the county of Bedford, and evinces the moſt unpardonable negligence on the part of the farmers, who, from their vicinity to the great market of London, have it ſo much in their power to reap the greateſt poſſible advantage from the proper cultivation and management of turnip-crops.

When the plants have got four or five leaves, the field ſhould be carefully hand-hoed, or horſe and hand hoed, according to the mode of ſowing, and care ſhould be taken to thin the plants which ſtand too cloſe together. It is difficult, or rather impracticable, to lay down any general rule as to the diſtance at which the plants ſhould be allowed to ſtand from each other, ſo much depending on the ſoil, the time of ſowing, and the uſes to which the crops are intended to be applied. At the firſt hoeing, the plants are generally left ſix or eight inches aſunder; but at the ſecond hoeing, which ſhould be performed three weeks or a month after the firſt, the plants that are allowed to ſtand for a crop, are left at from ten to fourteen inches diſtance in the broad-caſt huſbandry, and in the horſe-hoeing huſbandry about nine, ſometimes twelve or fifteen, inches aſunder, in the rows or drills. It

ſeems

ſeems a general rule to increaſe or decreaſe the diſtance, according as the crop is to be conſumed by cattle or ſheep, or to be uſed early or late in the ſeaſon.

The ordinary price paid for two hand-hoeings, when turnips are cultivated broad-caſt, is from 5 s. to 7 s. the Engliſh acre. In Norfolk, 6 s. is the common allowance. For hand-hoeing turnips cultivated in drills, the expence ſeldom exceeds 4 s. the acre.

The fly, that deſtructive enemy to young turnips, is very ſimilar in ſhape to the weevil that deſtroys the corn. The cauſes of the frequent deſtruction of crops of turnips by the fly, is one of thoſe myſteries in the ſcience of agriculture, which men of great knowledge and ſagacity have endeavoured in vain to diſcover. Of the many boaſted recipes for preſerving young turnips from that pernicious inſect, few deſerve notice. Perhaps the greateſt dependence ought to be placed on the fertility of the ſoil. If it is naturally rich, or has been well manured, the growth of the plants will be ſo much accelerated, that they will in a very ſhort time be out of the reach of the fly; as when once the plants diſplay what is called the rough leaf, this inſect has no longer a power of deſtroying them. Paſſing, therefore, the numerous preſcriptions that have been held out as efficacious for preventing this evil, none of which have ever been carried into general practice,

practice, one only ſhall be mentioned, which, as it is ſimple, and carries with it a probability of ſucceſs, appears to merit attention. It is, to ſow ſeed of the laſt year's gathering, and ſeed of the former year, mixed together, by which means the turnips will come up at different periods, and thereby have a double chance of eſcaping. An improvement on this method has been ſuggeſted, namely, to ſteep one-half of the ſeed in water for twenty-four hours, after having been mixed, as directed above, and then the other half, which remained unſteeped, being again mixed with that which had been ſteeped, the whole is ſown in the manner commonly practiſed. By this previous management, the turnips will riſe at four different periods, and although the fly may deſtroy ſome of the plants, there will yet remain a ſufficient number for a crop. This precaution is ſtrongly recommended, becauſe it has been obſerved on many occaſions, that theſe flies make their appearance very ſuddenly, and in great ſwarms, and that after eating up the turnips as faſt as they grow, they frequently diſappear as ſuddenly, ſo that the turnips which riſe a few days after in a neighbouring field, are not at all injured; and hence, from the ſame parity of reaſoning it follows, that when the turnips of the ſame field riſe at four different periods, one or other of the crops have a great chance to eſcape unhurt.

The next thing to be attended to in the management of this ſort of crop is, to ſecure the turnips from froſt, and to preſerve them as long as poſſible in the ſpring; which, when the froſts are ſevere, is ſcarcely practicable, unleſs by previouſly drawing and houſing them. This method, where turnip-huſbandry is practiſed on a large ſcale, would be both troubleſome and expenſive. There is another way of preſerving turnips frequently adopted in Hertfordſhire, which is attended with little trouble, and has been found very effectual. It is to ſtack them on the field with ſtraw, one load of which is ſufficient for thirty or forty tons of turnips. After drawing the turnips, the tops and tap-roots are cut off; and a layer of ſtraw being ſpread on the ground, on this is placed a layer of turnips, eighteen inches or two feet thick, then again a layer of ſtraw, and ſo on alternately, till the heap is brought to a point. This done, the edges of the layers of ſtraw are turned up, which, beſides preventing the turnips from rolling out, alſo ſerves in ſome meaſure for a cover to the ſides of the heaps, which being alſo well thatched on the top with long ſtraw, ſecures the turnips from receiving any injury from the weather, however ſevere. This method, if adopted in Scotland, would prevent many crops from being deſtroyed by ſudden alterations of the weather from freſh to froſt, and from froſt to freſh, than

which

which nothing is ſo injurious to a crop of turnips; as after a tract of ſuch variable weather, it is common to ſee large fields entirely deſtroyed, and almoſt every turnip reduced to a kind of ſoapy ſubſtance.

The manner of uſing or conſuming turnips, varies conſiderably. Over all the ſouthern counties of England, except Norfolk, the practice of folding or hurdling ſheep on the turnip-fields, is univerſal, and is almoſt the only mode in which crops of turnips are conſumed. In the county of Norfolk, although the practice of folding ſheep is alſo common, yet other methods of conſuming turnips are adopted, and reduced to general practice. There the whole crop is ſometimes drawn, and carted off to an adjoining graſs or ſtubble field. Sometimes the one half of the crop is carted off, and the other is diſtributed on the ſurface of the turnip field; and ſometimes again the whole crop is drawn, and ſcattered on the field on which they grew. Theſe various practices are adopted, and deemed neceſſary, in conſequence of the different modes in which crops of turnips in that diſtrict are conſumed. In the firſt caſe, the crop is chiefly applied to fattening cattle: In the ſecond, it is partly uſed in fattening cattle, and partly eat off by ſheep folded on the field; and in the third, the crop is devoted to fattening ſheep, with ſometimes a few bullocks. Norfolk is the only county in the

the ſouthern part of England, where the practice of fattening cattle on turnips is common. Great numbers of Scotch, Welſh, and Iriſh cattle are annually purchaſed for that purpoſe. There are three methods of giving turnips to cattle, commonly adopted in that county. The firſt, and the one that is moſt general, is, to ſcatter the turnips on a graſs or ſtubble field, and to keep the fattening cattle conſtantly there, except in very ſevere weather, when they are brought home to the ſtraw-yard. The ſecond is, to give them to the cattle in bins or cribs in the ſtraw-yard; and a third, which is certainly the beſt, although comparatively ſeldom adopted, is to give them to cattle that are tied up to ſtalls, in houſes or ſheds erected for the purpoſe.

Great numbers of ſheep are alſo fattened on turnips in Norfolk, in the mode of doing which, there is nothing materially different from that practiſed in other diſtricts, where the folding of ſheep on turnips is common, except that in Norfolk, the turnips are drawn before the hurdles are ſet, or the ſheep folded; whereas in every other part of England, they are folded on the ſtanding turnips. The former is juſtly conſidered a preferable mode, as the ſheep are not ſo apt to break or ſoil the turnips in the one caſe as in the other. The manner of folding ſheep in England has already been generally deſcribed;

ſcribed; therefore, any account of the method of doing it on turnip-fields is unneceſſary.

In Scotland, the crops of turnips are conſumed either in rearing young cattle, or in fattening bullocks; the one or other of theſe methods being adopted by the farmers, according to their ſituation in regard to markets. The turnips are given to the young cattle in the ſtraw-yard, when the farm poſſeſſes that advantage; otherwiſe in houſes, or ſheds. The bullocks, or fattening cattle, are ſtall-fed on turnips, and alſo an allowance of hay or ſtraw, morning and evening.

There are very few turnips given to ſheep in Scotland, except where the more valuable breeds of England have been introduced. When turnips are given, they are carried to an adjoining paſture-field, and ſcattered on the drieſt and pooreſt parts of it. As a ſpirit for introducing better breeds now prevails in various diſtricts, the practice of feeding ſheep on turnips will no doubt gain ground; at the ſame time, from the general moiſtneſs of the climate, and the poachy nature of the predominant ſoils, there is no reaſon to ſuppoſe, that folding ſheep on turnip-fields in winter will ever be an eſtabliſhed practice, or prove advantageous, if adopted. This method, notwithſtanding it is general in England, does not by any means appear ſo proper, as that of carting off the turnips, and conſuming

ing them either in the manner done in Scotland, or in Norfolk, as above described. A field muſt be very carelesly prepared for a crop of turnips, both in regard to tillage and manure, when a second dunging is rendered immediately neceſſary. One great advantage that a farmer derives from a crop of turnips is, the quantity of dung which, with proper management, is produced from its conſumption. That, therefore, muſt be the beſt mode of conſuming the crop, which inſures the greateſt quantity of dung, and at the ſame time, leaves the farmer at liberty to apply it to ſuch of his fields as ſtand moſt in need of manure.

The value of a crop of turnips may be reckoned from L. 2 to L. 5 the Engliſh acre, varying according to the quality of the crop, the mode in which it is conſumed, either in fattening or rearing live ſtock, and the prices of theſe at market. The ordinary way of determining the quality or goodneſs of a crop of turnips is, by the number of bullocks or ſheep that it will fatten. It is found, that an acre of good turnips will fatten a bullock of forty ſtone Amſterdam, or eight ſheep.

There was a new ſpecies of turnips lately introduced, called *Ruta Baga*, or Swediſh turnip, reſpecting the ſuperior excellence of which, and the advantages that might be derived from its

general

general cultivation, much has been ſaid and written. It has been tried in Northumberland, and ſome other counties; but neither there, nor in any other part of Great Britain, has it been ſo long, or ſo extenſively cultivated, as to enable any perſon to draw poſitive concluſions in regard to its comparative qualities. The concluſions, however, which thoſe who have tried it partially, have been able to form, are rather unfavourable; from which it may be inferred, that this root will not in all probability be generally cultivated in theſe kingdoms.

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SECTION II.

The Culture of Potatoes, and the Uſes to which they are generally applied.

THIS ineſtimable plant, which may with the greateſt propriety be denominated the *bread-root* of Great Britain and Ireland, was firſt brought from Virginia by the memorable, but ill-fated, Sir Walter Raleigh; who, on his return homeward in the year 1623, ſtopping at Ireland diſtributed a number potatoes in that kingdom. Theſe having been planted, multiplied accordingly; and, in a few years, the cultivation of them became general *; in ſo much, that during the wars which ſoon after happened in that country, when the growing corns were deſtroyed, the peaſantry ſubſiſted chiefly on potatoes. Owing to the general cultivation of this root, the inhabitants of Ireland were alſo, in a great meaſure, relieved from the hardſhips which they muſt

* The firſt trial the inhabitants made of them, was on the apples, which they boiled and ate; but theſe not agreeing with the ſtomach, they made the happy experiment on the root, which ever ſince hath proved ſo beneficial to that kingdom. See Muſeum Ruſticum, vol. i. page 359.

muſt otherwiſe have experienced, from the laſt ſevere famine with which they were viſited; and which, as it laſted two years, muſt have been extremely diſtreſſing, had the people's ſole dependence been on the crops of grain, theſe having generally failed.

Potatoes were brought from Ireland into Great Britain; and, owing to a ſhip loaded with potatoes being wrecked on the coaſt of Lancaſter, the cultivation of that root, in the field, was firſt generally eſtabliſhed there. Within theſe laſt fifty years, the culture of potatoes has been introduced and extended in every part of both kingdoms; but is now much more general in Scotland than in England, a few counties only excepted.

During the great ſcarcity of grain which happened in the north of Scotland, in conſequence of the failure of crop 1782, many thouſands of the inhabitants muſt have been reduced to the greateſt diſtreſs, but for the relief which potatoes afforded them. Although the crop of potatoes failed to a conſiderable degree laſt year (1795), yet every one knows how much the miſeries conſequent on ſo great a failure of the crop of grain as happened, have been alleviated in conſequence of this root being ſo generally cultivated, and in ſuch abundance.

There are only two general varieties of potatoes known in theſe kingdoms: theſe are diſtinguiſhed by the names of the red-rooted, which

carry purple flowers, and the white-rooted, which bear white flowers; but it having become common to raiſe potatoes from the apple or ſeed, a collection of endleſs varieties have been thereby procured.

As great improvements may yet be made, both in the quality and productiveneſs of this plant, by raiſing potatoes from the ſeed, a method practiſed by ſome intelligent farmers in Yorkſhire, ſeems particularly worthy of notice. It is as follows: In autumn, when the apples are beginning to fall ſpontaneouſly, they are gathered by hand, and preſerved among ſand until the ſpring, when they are maſhed among the ſand, or among freſh mould; ſeparating the ſeeds, and mixing them evenly with the mould. So ſoon as the ſpring froſts are judged to be over, they are ſown in fine garden mould; and as faſt as the plants get into rough leaf, and are ſtrong enough to be handled without injury, they are tranſplanted into another bed of freſh mould, in rows, which are kept clean during ſummer. In autumn, bunches of ſmall potatoes are found at the roots of theſe plants; varying in ſize, the firſt year, from an hazle-nut to that of a crab-apple. Theſe being planted in the ſucceeding ſpring, produce potatoes of the middle ſize; but they do not arrive at their fulleſt bulk, until the third or fourth year. When the uſe of the ſtove, or the garden-frame, can be procured, this proceſs may be

be ſhortened: The ſeeds being ſown within theſe, early in the ſpring, the plants will be fit to be planted out, as ſoon as the froſts are gone; by which means, the ſize of the roots will be much increaſed the firſt year, and will, in the ſecond year, riſe nearly to perfection.

In ſelecting proper plants from ſeedling potatoes, two things merit attention:—the quality of the potato, and its productiveneſs. If theſe two properties be united in one plant, there is no occaſion to heſitate in determining the preference to which it is entitled; and to attention in this reſpect, it is probably in a great meaſure owing, that ſo many valuable ſorts have been, and now are, cultivated in theſe kingdoms.

Potatoes will grow in almoſt any ſoil, even in that of the moſt indifferent quality; but the ſoil in which this plant thrives beſt, and where potatoes of the beſt quality are produced, is a light ſandy loam, neither too dry nor too moiſt.

Potatoes, like all other vegetables, require a certain period to come to maturity. It has been proved, from long and general experience, that the month of April is the beſt ſeaſon for planting this root, ſo as to produce a farinaceous or meally crop. Potatoes are frequently planted in the end of May, and ſometimes even in June; but the crops, although often as abundant, are neither ſo mellow nor mature, as when the ſets are

planted

planted in April, or in the firſt eight or ten days of May.

Potatoes are propagated in a manner very different from the other roots cultivated in theſe kingdoms. There are a number of what are called *eyes* in every root, each of which produces a ſeparate plant. This points out the propriety of planting the large and middle-ſized roots, properly cut, in place of the ſmalleſt, uncut; as when the larger potatoes are properly cut, one, or at moſt two eyes only, being left in each ſet, there is no danger of too many plants ſpringing from the ſame root, which muſt often happen, when ſmall potatoes, with a great number of eyes, are ſet whole.

It is the common practice, and againſt which there appears no well-founded objection, to cut potatoes, intended for ſeed, into ſmall pieces, about half an inch ſquare; in the courſe of which operation, attention is paid to ſingle out the eyes that appear ſtrongeſt, and moſt vigorous. In this way, one root of ordinary ſize furniſhes three or four ſets, or pieces proper for planting. This, for the reaſon above mentioned, is a better method than ſetting either large or ſmall potatoes uncut.

There are various methods of cultivating potatoes, adopted in theſe kingdoms. Of theſe, there are three, which, being more common than the others, merit a particular deſcription.

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1ſt. The manner of cultivating them by farmers; on a large ſcale. *2dly.* The mode adopted, when cultivated by the inhabitants of towns and villages. And, *3dly.* The lazy-bed way, or the manner practiſed by the people in many of the remote diſtricts.

Potatoes are cultivated by farmers in general, after every ſort of white-corn crop; but in Lancaſhire, this root is for the moſt part cultivated on lands broken-up from graſs for the purpoſe. This practice was no doubt borrowed from Ireland where it appears to have been generally eſtabliſhed, ſoon after the introduction of potatoes into that country.

The land on which it is propoſed to plant potatoes, commonly receives three ploughings: The firſt in autumn, the ſecond ſome time in the ſpring, and the third at the ſeaſon of planting.

There are different methods of applying the dung, which however ought always to be done with a liberal hand. Sometimes the field is formed into one-furrow ridges, at the ſecond ploughing. The dung is then laid in the furrows; and the potatoes, being planted by hand on the dung, and at the diſtance of ten or twelve inches aſunder, in the furrows or drills, are then covered up with the plough, which is done by ſplitting the one-furrow ridges. Another, and a very general method, is, to dung the whole

whole ſurface of the field, after the ſecond ploughing, and to plant the ſets in every third furrow. In either of theſe caſes, the land is kept clean by repeated horſe and hand hoeings, which are given in the courſe of the following ſeaſon.

The modes of cultivating potatoes in the neighbourhood of towns and villages in Scotland is different. The farmer lets a field to the inhabitants at a certain rent by the rood or perch. The renters or hirers of the land pay a ſpecified rent, and agree to furniſh a ſufficient quantity of dung. The farmer is at the expence of carrying the dung, and of ploughing and harrowing the field. The renters attend at the laſt ploughing, and plant the ſets in the bottom of every furrow. Another, and a preferable method on ſoils of proper depth, is pretty commonly adopted in Lancaſhire, and in ſome diſtricts in the north-eaſt of Scotland: Namely, to trench the land. The farmer having carried the dung, and laid it on the field in heaps, at proper diſtances, the operation is performed by the manufacturers and people who rent the field, and in the following manner. Acroſs the end of the ridge, a trench is formed, about three feet wide, and from ten to fourteen inches deep, according to the depth and quality of the ſubſoil. That being done, a ſecond trench of the ſame breadth is marked off, and the ſurface-ſoil, to the depth of ſix or eight inches, is thrown into the bottom of the

the former trench, over which a ſufficient quantity of dung being laid, the potatoes are planted at the diſtance of eight or ten inches from each other, and then as much earth is taken from the bottom of the ſecond trench, as is neceſſary for covering the potato ſets, and of making up the firſt trench to its former level. Thus the field being completely trenched, well manured, and kept thoroughly clean by repeated hand-hoeings muſt not only produce an abundant crop of potatoes, but alſo be in high condition for receiving whatever kind of ſeed may be afterwards ſown.—The only other method of culture neceſſary to be mentioned is the lazy-bed way, which was formerly well known in many parts of England, as well as all over Scotland, although now confined to the very remote diſtricts of the latter kingdom. The term applied to this mode of culture, indicates that it was invented to ſave labour, and muſt have been adopted for any length of time by thoſe only whom indolence and ignorance precluded from following other methods. Theſe beds are formed of ſuch a breadth as that any man, uſed to to the ſpade, can with eaſe throw earth almoſt from one ſide to the other. The manner of forming them is as follows: The ſize of the bed is firſt marked off with a line, and from two to four feet left on each ſide for trenches. The ſurface of the bed being then dug, or turned over

over with the ſpade, the dung is ſpread, and the ſets planted, at about the diſtances laſt mentioned, after which earth from the trenches on each ſide of the bed is thrown over the dung, and the plants, ſo as to cover them to the depth of three or four inches. From the quantity of dung applied, and the degree of attention beſtowed in hand-weeding, (for in the diſtricts where this method is ſtill practiſed, hand-hoes are little known), good crops are often obtained. Nor is it to be wondered at, where the ſoil is of a proper depth, and the trenches ſo wide as to afford a ſufficient quantity of good earth for covering: But on the generality of ſoils it is ſcarcely poſſible to adopt a mode of culture more contrary to common ſenſe.

Potatoes are conſidered as being ripe, and at their full ſize, when the leaves begin to fall off the ſtalks, and they ought to be taken up and ſtored for winter and ſpring uſe, after the firſt froſts in autumn, which generally take place about the end of September, or the beginning of October, and by which time the haulm, or ſtem, is completely withered.

The method of taking up a crop of potatoes depends on the manner in which it has been cultivated. If the potatoes were planted in drills and horſe-hoed, the ordinary way is firſt to turn a furrow from each ſide of the drill, and then to turn over with the plough that part of the drill in which

which the potatoes are lodged, and which are afterwards gathered by women and children hired for the purpoſe. Sometimes the middle part of the drill, after the two ſide-furrows are taken from it, is turned over by men with three-pronged forks. In other places, the three-pronged fork entirely ſupplies the place of the plough, which is never introduced. Where a ſufficient number of women and children can be procured for gathering the crop, uſing the plough is certainly the moſt expeditious and leaſt expenſive mode. In order to avoid the riſk of cutting the potatoes with the coulter, it is commonly taken out, and the plough with only a ſhare, or ſock, is uſed for turning over the middle part of the drill, which, as it performs the operation as effectually, is no doubt an improvement, and may be conſidered the beſt implement that can be uſed in taking up a crop of horſe-hoed potatoes. When potatoes are planted with the ſpade or the plough, and with an intention of hand-hoeing the crop only, the common method of taking up the potatoes is with the ſpade, one gatherer attending every perſon who is employed in turning over the ground. Crops of potatoes thus cultivated are ſometimes taken up with the plough. When that happens, it is found neceſſary to plough the field two or three times over, otherwiſe it is ſcarcely poſſible to get the crop properly collected.

After the potatoes are gathered, if the weather be favourable, they ſhould be allowed to remain ſome days to dry, before they are ſtored up, as it will give them a much better chance of keeping. There are ſeveral ways of ſtoring up potatoes: The beſt is certainly that by which they can be kept moſt effectually dry, and at the ſame time free from the influence of froſt. Putting them into cloſe houſes, and covering them well up with dry ſtraw, is the moſt effectual mode, and that which is generally adopted. In ſome parts of Scotland, it is a common practice to dig pits in the potato-field, when the ſoil is dry and light, and, putting in potatoes to the depth of three or four feet, to lay a little dry ſtraw over them, and then cover them up with earth, ſo deep that no froſts can affect them. Another method, which is practiſed in England as well as Scotland, is to put them together in heaps, and cover them up with ſtraw, in the the manner formerly deſcribed as the beſt means of preſerving turnips, with this addition, that the heaps are afterwards well covered with earth, and ſo cloſely packed together as to exclude froſt. The farmers in Lancaſhire ſort and ſeparate their potatoes, in the courſe of taking them up, according to their ſizes, and are particularly careful to throw aſide all thoſe that are ſpoiled before raiſing, or that are cut in the taking up. This is a very neceſſary and proper precaution,

precaution, (although by no means generally attended to), as the crop muſt have a much better chance for keeping, than when diſeaſed or cut potatoes are ſtored up with it.

The curled diſeaſe, or blight, is the diſtemper to which this plant is moſt liable. It ſhows itſelf very early in the ſeaſon, by a curling in the leaves, and ſometimes to ſuch a degree, that whole fields are rendered thereby in a great meaſure unproductive. The cauſe of this diſeaſe not being yet perfectly underſtood, it would be unintereſting to give a detailed account of the various conjectures that have been formed on this ſubject, or of the remedies that have been ſuggeſted as the moſt likely to prevent the evil. Suffice it to ſay, that frequent changes of ſeed, uſing large ſets, cultivating and manuring the land in a proper manner, and not repeating that ſpecies of crop too often on the ſame field, have hitherto been found the beſt preventatives.

Potatoes are much more a common article of food among the peaſantry in Scotland, than in England. Hence the reaſon why ſo great a proportion of the arable lands in the former kingdom is devoted to the cultivation of potatoes; and it is alſo the reaſon why the beſt modes of cultivating that root, are generally better underſtood here than in England. If the proper management of a crop of potatoes depend on the careful cultivation of the ſoil, manuring

manuring it liberally, keeping the land clean, and ſtoring the crop with care and attention, it may be ſaid there is ſcarcely an old woman who occupies a cabbage-garden in North Britain, who is not as good a cultivator of potatoes as the moſt expert farmer. It was lately propoſed in Parliament, to give a very large bounty, as a mean of encouraging an increaſed cultivation of potatoes. If that root, from the general uſe of which the poorer claſſes of people in Scotland have derived ſo much benefit, could be introduced as a common article of food among the peaſantry in England, the neceſſity of holding out ſuch premiums would at once ceaſe, as the farmers, without being bribed, would cultivate additional quantities in proportion to the increaſed demand. Till the demand ſhall greatly increaſe, which can only happen from the cauſe above mentioned, to extend the cultivation of that root in the manner propoſed, would, in the writer's apprehenſion, be a miſapplication of the lands, which can, under the preſent circumſtances, be more profitably employed in the cultivation of grain and graſs.

Various modes of preparing potatoes for human food, have lately, owing to the preſſure of the times, been ſuggeſted; ſome of them have already been ſhown to be no improvement, and, as many of the others will be forgotten, when plenty

ty again viſits the land, an inſertion of them here will be readily diſpenſed with.

In Lancaſhire and Suffolk, there are two ſorts of potatoes cultivated, chiefly for feeding horſes, cattle, hogs, &c.; in the former diſtrict, the ox-noble, and in the latter the cluſter-potato. In Scotland, the Surinam potatoes (called yams) are very generally cultivated for the ſame purpoſe. Although the uſes to which theſe potatoes are applied, are the ſame in both kingdoms, yet the previous mode of preparation is different. In England, they are generally waſhed, and being boiled, are mixed with chaff, bran, barley, or oat-meal, before they are given to any ſpecies of live-ſtock. In Scotland, when given to horſes, they are waſhed, but when given to cattle, or hogs, no preparation of any kind is deemed neceſſary. The mode practiſed in England being evidently ſuperior to that common in Scotland, is therefore well worthy of imitation.

The multiplicity of weights and meaſures, by which potatoes are ſold in the various market-towns in Great Britain, renders it almoſt impoſſible to give an accurate account of the value of a crop by the acre. It varies in weight from five to eight, and ſometimes ten tons; probably the general average may be nearly ſix tons the Engliſh acre. The medium price of potatoes ſhipped at Dundee, has been, for ſome years, about 35 s. the

the ton, equal to L. 10, 10 s. the acre,—a ſufficient inducement, one would think, for every farmer to cultivate as great a quantity of this uſeful root, as he could get diſpoſed of, without receiving any bounty from Government.

As potatoes form ſo conſiderable a proportion of the food of the common people, eſpecially in Scotland, it would be of the higheſt importance, could ſome means be deviſed to preſerve them from ſpoiling during the whole year. The beſt method yet diſcovered for keeping potatoes found for the longeſt period, is to ſpread them on a dry floor early in the ſpring, and to rub off the eyes occaſionally, as they appear to have a tendency to puſh out; by uſing theſe precautions, the writer has frequently ſeen potatoes kept in good condition till the month of June.

An ingenious method has been ſuggeſted, of procuring a ſupply from the new crop, that well merits attention. It is to take up carefully with the hand the potatoes that lie neareſt the ſurface. This, in place of injuring the crop, will rather improve it. If this practice were generally adopted by the poor people, who are often obliged from neceſſity to have recourſe to the new crop at a very early period, and to dig up a conſiderable part of it before it comes to maturity, that diminution of the crop would be in a great meaſure prevented.

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The benefits derived from the cultivation of potatoes are known more or leſs to every inhabitant of both kingdoms. It is therefore only neceſſary to add, that they are ſuch as cannot fail to induce the cultivators of the Britiſh ſoil to increaſe the quantity, in proportion as the population of the country increaſes, and the demand for that article, becomes greater.—If Ceres, the Sicilian woman, who, about the year 1030 before Chriſt *, firſt taught the Greeks to ſow corn, and to make bread, was, for this benefit to mankind, reputed a goddeſs after death! what modern Briton, but muſt reſpect the memory of Sir Walter Raleigh, who firſt happily introduced this uſeful root into theſe kingdoms! —a root of more value to Europe, than all the gold of Peru, or the diamonds of Golconda.

* See Sir Iſaac Newton's Chronol. p. 15.

SECTION III.

The Culture of Carrots, and the Uſes to which they are generally applied.

THE cultivation of this root was firſt introduced into England by the Flemings, who ſettled there in the reign of Queen Elizabeth. Carrots have been long cultivated in Flanders, as food for horſes. But although it appears that this root has been long cultivated in the fields in the county of Suffolk, yet the crops were always ſent to the London market; the uſe of carrots as food for live ſtock having been little known, either in that, or in any other diſtrict of theſe kingdoms, till within theſe few years.

Crops of carrots are cultivated to the greateſt advantage in a warm, light, loamy, or ſandy ſoil, and have the beſt chance of ſucceeding, when ſown after barley. The land ſhould be ploughed as deep as poſſible in October, a ſecond time in February, and again in March, which is the proper ſeaſon for ſowing the ſeed. By ploughing the land deep in October, two purpoſes are anſwered; new ſoil is expoſed to the influence of the winter froſts, whereby it is mellowed, and

rendered fitter for nouriſhing the following crop. The roots of the carrots are alſo enabled, with more freedom, to puſh downwards, a very material circumſtance to be attended to in carrot-huſbandry; for, if the roots meet with any obſtruction in getting down, they are very apt to grow forked, and ſhoot out lateral roots, which materially injures the crop.

After the laſt ploughing is given in March, the land ſhould be harrowed, and the ſurface made as fine as poſſible; then five pounds of ſeed ſhould be ſown on the acre, and gently harrowed in. The ſeeds of carrots cling ſo cloſe together, that it is impoſſible to ſow them with any regularity, without adopting ſome means for ſeparating them beforehand. The beſt way is to mix them with a quantity of bran, or dry ſand, and then to rub the whole well together. This will not only diſengage the ſeeds from each other, but alſo enable the ſeedſman to ſcatter them more regularly, than he could otherwiſe do.

Crops of carrots ſhould be hoed three times in the ſeaſon. The firſt time, as ſoon as the plants can be diſtinguiſhed from the weeds which ſurround them. The firſt hoeing ſhould be performed with three-inch hoes, having handles not above two feet in length; this operation requires to be performed with great attention, as it is extremely difficult to diſtin-

guiſh and ſeparate the young carrots from the weeds. The ſecond hoeing ſhould be given in three or four weeks afterwards, according to the forwardneſs of the crop. It may be performed with common hoes, care being taken to ſet out the plants at proper diſtances. From fifteen to eighteen inches each way, is the common diſtance at which they are allowed to ſtand; and it has been proved from many years experience in Suffolk, that carrots which grow at theſe diſtances, always prove a more abundant crop, than when the plants are allowed to ſtand cloſer together. The third hoeing is commonly performed about the middle or end of June; and, beſides deſtroying the weeds, the only other material circumſtance to be attended to, is to ſet out the carrots at proper diſtances; and wherever any have been left double at the former hoeings, to take the worſt of the two plants away. The expence of hoeing carrots in Suffolk, in the manner above directed, is from 16 s. to 18 s. the acre.

Although it is a very common practice with the farmers in Suffolk, to allow a crop of carrots to remain in the ground all winter, yet it ought by no means to be recommended. Beſides the injury which the crop muſt frequently ſuſtain by ſevere froſts, the farmers cannot avoid often experiencing great difficulty in getting up a ſufficient quantity of carrots for

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the ſupply of their live ſtock, eſpecially when the earth is bound up with froſt, or covered with ſnow. For theſe reaſons, it muſt appear evident, that the beſt way of preſerving carrots during winter and ſpring is, to dig them up in the end of October, or beginning of November, when their green leaves are decayed;—a practice common in Leiceſterſhire. The beſt method of taking up carrots, is with three-pronged forks, although ſpades are frequently uſed. By looſening the ſoil with either of theſe inſtruments, and drawing up the carrots at the ſame time by the top, the work is very expeditiouſly performed. The carrots ſhould be allowed to dry for a day or two on the field, before they are taken home, as was directed to be done with potatoes. When they are dry, the tops ſhould be taken off, and given to the ſwine, or cattle; and the roots ſhould be piled up in heaps in ſome cloſe houſe, and well covered up, either with ſtraw or dry ſand, ſo as to defend them from the froſt.

By Mr Arthur Young's account, carrots are cultivated to a greater extent in Suffolk, than in any other part of England, or rather than in all the reſt of the kingdom put together. A medium crop may be reckoned at three hundred and fifty buſhels the acre, which, at ſixpence the buſhel, (the price at which they are ſold to be ſent to London), amounts to L. 8, 15s. the acre. The hoeing and digging a crop of carrots, are

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no doubt attended with conſiderable expence; but the above groſs produce will amply repay that and every other, and leave a very handſome profit.

The uſes to which carrots are applied in Suffolk, are various. Large quantities are ſtill ſhipped off for the London market. The remainder is given as food to the various ſpecies of live ſtock. Horſes are remarkably fond of carrots; and it is even ſaid, that when oats and carrots are given together, the horſes leave the oats, and eat the carrots. The ordinary allowance, is about 40 or 50 lbs. a-day to each horſe. Carrots, when mixed with chaff, (cut ſtraw), and a little hay, without corn, keep horſes in excellent condition for performing all kinds of ordinary labour. The farmers begin to feed their horſes with carrots in December, and continue to give them chiefly that kind of provender till the beginning or middle of May; to which period, with proper care, carrots may be preſerved. As many of the farmers in that county are of opinion, that carrots are not ſo good for horſes in winter as in ſpring, they give only half the above allowance of carrots, at firſt, and add a little corn for a few weeks after they begin to uſe carrots.

Carrots have been uſed for fattening cattle with great ſucceſs; and have been long proved to be excellent food for milch cows in the ſpring; they

they give no bad taſte to the milk or butter, while the quantity of both is greatly increaſed.

Sheep are alſo frequently fattened on this root in Suffolk. By Mr Young's account, (to whom the public is greatly indebted for his many important communications reſpecting carrot-huſbandry), a good crop of carrots will weigh eleven tons. He ſuppoſes that quantity will feed twenty wethers for 100 days, in which ſpace they will be completely fattened. It is reckoned a good crop of turnips in Norfolk, that will fatten eight wethers; ſo that it appears, one acre of carrots will go as far in fattening ſheep, as two acres and a half of turnips.

Mr Young ſtates, that the expence of cultivating carrots, exceeds that of turnips, by about L. 1 the acre. To counterbalance which, he ſays, the carrots are much more impenetrable to froſt, if left in the ground to be taken up as wanted; that they are not ſubject to any diſtempers ſimilar to that of the fly in turnips; and that they are ſown at a ſeaſon when they cannot ſuffer by drought: While, of late years, turnips have ſuffered ſo much in various ways, as to have ſubjected the farmers, particularly thoſe of Norfolk and Suffolk, to very heavy loſſes. Beſides, as carrots can be preſerved with certainty to an advanced period of the ſpring, (April or May), when the fattening of cattle is more expenſive than at any other ſeaſon, the ſu-

periority of carrots over turnips, muſt appear evident to every practical farmer.

Mr Young further obſerves, that with all theſe advantages, it might naturally be expected, that carrots ſhould be more univerſally cultivated; and that the only reaſon why they are not, is, becauſe their value is not aſcertained, or made generally known *. This ſeems indeed the only proper reaſon that can be aſſigned, why the cultivation of a crop ſo valuable, ſhould be confined to one diſtrict of a great kingdom;—a crop which, no doubt, if it were commonly cultivated, would be the means of ſaving an immenſe conſumption of oats, peaſe, and beans, which are at preſent given to horſes.

* See Young's Annals of Huſbandry.

SEC.

SECTION IV.

The Culture of Cabbages, and the Uſes to which they are generally applied.

CABBAGES have been partially cultivated for ſeveral years, as food for cattle and ſheep, in many of the counties of Great Britain; and where that branch of huſbandry has been carried on to the greateſt extent, as in Suffolk, Leiceſter, Lancaſhire, *&c.* it is found very beneficial.

Cabbages being nouriſhed by a long tap-root, they ought to be planted in a ſtrong deep ſoil. The very reverſe of thoſe ſoils which are univerſally allowed to be the moſt favourable for turnip-huſbandry, are beſt adapted for the cultivation of cabbages.

The great Aberdeen cabbage, and the open green cabbage, or, as it is called in Scotland, ſpring-kail, are the ſorts moſt cultivated. The former is ready for uſe in the beginning of winter, and in ordinary ſeaſons, continues good almoſt throughout the month of March. The latter is generally uſed in April, or the beginning of May, and is found excellent food for ſheep, at thoſe periods when ſcarcely any other ſpecies of green food can be procured.

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When cabbages are intended to be fed off in December, January or February, the plants ſhould be ſet in March or April, from ſeed ſown about the end of July the preceding year. When the crop is intended for uſe in March or April, the plants, from ſeed ſown the February or March before, ſhould be ſet in the firſt or ſecond week of July. The late ſetting of the plants tends to retard their growth in the end of the ſeaſon, by which means they grow more vigorouſly, and continue longer good in the following ſpring.

Three ploughings are commonly given in order to prepare a field in which cabbages are to be planted: the firſt is given in autumn, when the field ſhould be formed into three-feet ridges; in which condition it ſhould remain to be mellowed by the froſt during winter. In the ſpring, the field is again ploughed; ſoon after which, a ſufficient quantity of dung is applied, and the land being again immediately ploughed; and the form of three-feet ridges being ſtill preſerved, the plants ſhould be ſet in regular lines, along the crowns of the ridges, and at the diſtance of three feet from each other. If this operation be accurately performed, it will give an opportunity of ploughing or horſe-hoeing, not only along the ridges, but alſo acroſs them,—a mode which, if adopted, will, as Lord Kames obſerves, be attended with ſeveral ſignal advantages. It will, in a great

great meaſure, ſave the expence of hand-hoeing, as very little of the ſoil, except that immediately around the plants, will remain untouched by the plough; as cabbage-crops are always conſidered as a kind of fallow, the more generally and effectually the ſoil is turned and intermixed, the more completely will the intention propoſed by fallowing be obtained; and, in the third place, as plants are known to become more vigorous on every addition of freſh earth that is applied to their roots, this mode of cultivating cabbages muſt be conſidered preferable to all others in this reſpect, and cannot fail, in ordinary ſeaſons, and with proper attention, to inſure a good crop. There is ſcarcely a poſſibility of aſcertaining the value of a crop of cabbages by the acre. We are informed by Mr Young, that an average-crop in Suffolk is eſtimated at thirty tons the acre, and the value from L. 4 to L. 7. The weight, however, muſt depend as much on the ſoil and mode of culture, as the value does on the ſpecies of live ſtock by which the crop is conſumed, and the ſituation of the farm in regard to markets.

The crops of cabbages cultivated in theſe kingdoms are uſed chiefly in feeding milch cows. It is well known, that when this ſpecies of live ſtock is feed on turnips, the milk and butter have a diſagreeable taſte, which renders both comparatively of little value. Many re-

cipes, in order to prevent this bad taſte in the milk and butter of cows fed on turnips, have been publiſhed, the knowledge of which is ſaid to have been obtained from repeated experiments, and the ſucceſs aſcertained by conſiderable practice. Notwithſtanding of this, it is believed, that no remedy has yet been diſcovered, on which full dependence ought to be placed; and it is much to be regretted, that writers on huſbandry too often publiſh crude indigeſted opinions of their own, or of others, with as little heſitation as if they had been ſanctioned by long experience, and proved well founded by general practice. As cabbages are for the moſt part conſumed in feeding milch cows, it is of importance to ſtate to the public, from moſt concluſive evidence, that neither the milk nor the butter is affected thereby. A circumſtance mentioned by Mr Young, in his Report of the preſent State of Agriculture in the County of Suffolk, places this matter beyond all doubt. He there obſerves, "That in reſpect to the utility "of cabbages for cows, there is but one opinion. "Every one agrees, that cabbages and ſtraw are "by far better food for milch cows than any "quantity of hay: And a circumſtance that "proved the goodneſs of the food for butter, "was the veal-carts, which go regularly from "this diſtrict to London, taking large quantities "of butter, which was ſold and eaten as hay-

"butter,

" butter, as long as the cabbages remain ſound; " but, when they rot, there is an end of this " laudable deceit, *as no management can do the " ſame thing with turnips.*"

Cabbages were more generally cultivated in Scotland ſome years ago, than they are at preſent. Although abundant crops were often obtained, yet the general introduction of turnip-huſbandry has been the mean in a great meaſure, of rendering the field-culture of cabbages leſs an object of attention. It is, however, certain, that cabbages are cultivated at ſmall expence; that they are ſubject to few diſeaſes; that they reſiſt froſt more than turnips, and that they are proved to be a palatable and nouriſhing food for cattle and ſheep; and by an experiment made by a Mr Jackſon, it would ſeem, that horſes alſo are fond of them, when chopped ſmall and mixed with corn *.

When a crop of turnips miſgives, either in whole or in part, which frequently happens, cabbages may be planted, on ſoils of ordinary depth, with the greateſt probability of ſucceſs, and at a very trifling expence,—a circumſtance to which every farmer, who cultivates turnips on a large ſcale, will do well to pay particular attention.

* See Muſeum Ruſticum, vol. i. p. 27.

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SECTION V.

The Culture of Tares, or Vetches, and the Uſes to which they are generally applied.

THE vetches commonly cultivated in theſe kingdoms, are of two ſorts: the black, and the white. Theſe are diſtinguiſhed by the names of the ſummer, and the winter vetch.

Vetches are cultivated chiefly for green food; there being no more of the general crop reſerved for maturing its ſeeds, than what is ſuppoſed neceſſary for ſowing the ſucceeding year.

There is ſcarcely any ſoil on which vetches will not thrive; but the moſt luxuriant crops are generally reaped from loams, which have a great ſhare of gravel in their compoſition.

Vetches, for the moſt part, ſucceed crops of wheat or barley. The winter-vetch is commonly ſown in October, after one ploughing, which is given ſoon after the harveſt-work is completed. The quantity of ſeed allowed to the acre, is from two to three buſhels. The land is generally twice ploughed, previous to the ſowing of ſummer-vetches; firſt in autumn, and a ſecond time in February or March. The ordinary ſeed-time, is in the months of March or April; and the allowance of ſeed the ſame as above

above mentioned. Vetches are ſometimes ſown at different periods on the ſame farm, which is a great improvement on this branch of huſbandry, as thereby a ſucceſſion of crops, during the whole ſummer, is ſecured.

All ſorts of live ſtock are particularly fond of vetches. In England, they are given to milch cows, in the ſpring; to horſes, before the clover crops are ready; and to lambs, at weaning-time. The culture of vetches has been but recently introduced into Scotland: They are principally uſed as food for horſes, between the firſt and ſecond cutting of clover.

Vetches, as being an ameliorating crop, certainly tend to the improvement of the ſoil; and, on that account, they ought to be cultivated in all proper ſituations. At the ſame time, the temperature of the climate, and other circumſtances, ought to be conſidered, before the cultivation of vetches, on a large ſcale, is attempted. If the climate be late, and vegetation backward in the ſpring, (which is generally the caſe in Scotland), it is doubtful whether a crop of broad clover, which is known to thrive almoſt everywhere in that country, will not, nine times out of ten, prove a more valuable crop than one of vetches; and it is ſtill more doubtful, whether the crop of vetches will be ready ſo much ſooner, as to render that crop more valuable than the other. In the ſouthern parts of England,

England, where they are bleſt with the return of ſpring, at leaſt three weeks ſooner than in Scotland, the matter is very different. Owing to the ſuperior excellence of the climate, the Engliſh farmer may, and often does, get what may be called a ſtolen crop of vetches. For example: He ſows vetches in October; theſe he reaps in the month of June, when the land, being in high condition, is after one ploughing ſown with turnips, as a preparation for barley. This is a mode of cultivating vetches very commonly practiſed in England, but which the Scotch farmer can never expect to follow with ſucceſs; and therefore, the cultivation of vetches muſt always be leſs an object of importance in the one country, than in the other. Upon the whole, although the writer knows, and is perfectly ſatisfied, that the cultivation of vetches is advantageous in England, yet he is fully of opinion, that, in Scotland, winter ſucceeds ſo rapidly to ſummer, and ſummer to winter, that the culture of vetches can never become a very eſſential improvement in the huſbandry of that country.

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SECTION VI.

The Culture of Rape, or Cole, and of Rye, as Winter and Spring Food for Sheep.

RAPE, or COLE, is a plant of the cabbage-kind, and is very much cultivated in ſeveral parts of England; both for its ſeed, from which the rape-oil is expreſſed, and as winter and ſpring food for ſheep, than which nothing is ſuperior, as theſe animals fatten more quickly on that, than on any other vegetable cultivated in the iſland. The greateſt proportion of the rape that is cultivated for ſeed, is ſown on land that has been previouſly pared and burned; the manner of doing which, will be afterwards deſcribed. When the land is prepared in the ordinary way, it is ploughed generally four, and ſometimes five times; once in autumn, twice in the ſpring, and once or twice before the ſeed is ſown, which is generally done in the month of June, or beginning of July, and at the rate of half a peck to the acre. Cole is ſometimes hand-hoed, but the practice is by no means general. Great care muſt be taken, that the crop be not allowed to remain too long uncut; as, in that caſe, it is very apt to ſhed its ſeeds. As ſoon as the pods begin

begin to aſſume a browniſh colour, it ſhould be reaped, and laid carefully on the ground, where it ought to remain, without moving, till it be ready for thraſhing. This is aſcertained, by the ſtraw or ſtalks becoming white, and the ſeed, when rubbed out, appearing black. Cole is always thraſhed on the field on which it grows, it being impoſſible to move it to any diſtance, without ſhaking out a great part of the ſeeds. The operation is performed on large cloths, about twenty yards ſquare; and, in order to do it expeditiouſly, a great number of hands are commonly employed.

Cole, on which ſheep has been folded, is in many places allowed to ſtand afterwards, to perfect its ſeeds. This is particularly the caſe in Northamptonſhire, as appears by the following extract from the Editor's Report of the preſent State of Agriculture of that diſtrict: "Cole, "or rape, is cultivated as ſpring food for ſheep. "The ſheep are folded in the ſame manner as "on rye and turnips; and continue till about "the end of February. If the winter be favour"able, and not very wet, the cole is ſometimes "allowed to ſtand for ſeed, when thirty buſhels, "on an average, are produced on the acre. This "article varies very much in price, from L. 18 "to L. 35 the laſt." As there are ten quarters, or eighty buſhels, in a laſt, the price of this article may be ſaid to vary from 4s. 6d. to 8s. 9d. the

the buſhel, according to the prices above mentioned; and from L. 6, 15 s. to L. 13 : 2 : 6 by the acre: average, L. 9 : 18 : 9.

Cole, when it thrives, and the ſeeds are got preſerved, is one of the moſt profitable crops known in England. It is at the ſame time extremely precarious; being, like turnips, very liable to be deſtroyed by ſwarms of flies and inſects. From what is obſerved above, it is alſo obvious, that uncommon care and attention is neceſſary in harveſting this ſort of crop. If it be not cut down at the proper time, or if a long continued tract of rain ſhould happen immediately afterwards, the crop is in great danger of being entirely loſt.

As winter and ſpring food for ſheep, it cannot be exceeded in quality; but in quantity, or weight of crop, turnips or cabbages are greatly ſuperior. It is highly probable, that the cultivators of cole, in order to turn out the crop to the greateſt poſſible advantage, ſhould always keep in view the double purpoſe to which it can be applied. By feeding it off with ſheep in the early part of winter, the following crop is not materially injured; ſo that, while a conſiderable ſupply of winter-food is procured, the return of cole-ſeed by the acre, would not be greatly, if at all diminiſhed; and this, therefore, of all others, ſeems the moſt profitable mode of management.

Rye, beſides being cultivated for its grain or ſeeds, is frequently ſown as ſpring-food for ſheep. This laſt-mentioned practice, although confined to a few of the ſouthern counties of England, may juſtly be conſidered as a great improvement in modern agriculture. Rye being the moſt hardy grain known in theſe kingdoms, the crop is more forward in the ſpring than any other; and is generally ready to be folded upon, by the time the crop of turnips is eat off. Rye, cultivated for this purpoſe, is alſo an additional crop gained; it being ſown after a crop of wheat, barley, oats, &c. on one ploughing, and is always eat off in proper time to give an opportunity to prepare the land for ſowing turnips: All the preparation neceſſary, indeed, being to plough the field; as, in conſequence of the previous ſheep-folding, it muſt be well manured for the ſucceeding crop.

The following table will ſhew the comparative value of the different ſorts of green crops above deſcribed.

TABLE

TABLE of the comparative Value of the different Crops mentioned in the preceding Account.

Crops.	Value by the Engliſh acre.			Value by the Scotch acre.		
	L.	s.	D.	L.	s.	D.
Turnips. The value may be eſtimated at - - - -	4	0	0	5	1	8
Potatoes. Average 6 tons, at L. 1, 15 s. *per* ton, -	10	10	0	13	6	10
Carrots. Average 350 buſhels, at 6 d. each buſhel, - -	8	15	0	11	2	4
Cabbages. From L. 4 to L. 7. Medium, - - - - -	5	10	0	6	19	9
Tares, or Vetches. Uncertain.						
Rape, or Cole. Average 30 buſhels, at 6 s. 7½ d. *per* buſhel,	9	18	9	12	12	6
Divide by 5,	38	13	9	49	3	1
General average value *per* acre,	7	14	9	9	16	7⅕

The general average value of green crops, by the above table, is ſufficient of itſelf, without any other conſideration, to ſatisfy every farmer of the profits to be derived from their cultivation. The improvement, as well as profit of a farm, will be found to depend more on the proper culture, and uſe of green food for horſes, cattle, and ſheep, than on any other circumſtance. It is perhaps in the proper culture, application, and variety of green crops, more than in any other

other particular, that the Engliſh farmer has the ſuperiority over his neighbour in Scotland. Be that as it may, it is clear, that no farmer can entertain too high an opinion of the advantages reſulting from a ſufficiency of green winter food for his live ſtock. The importance of having a ſufficient ſtock of ſuch food for his cattle, in place of depending entirely on hay or ſtraw, is too obvious to require explanation. Without this, his profits muſt be inconſiderable: His loſs, in the want of a neceſſary ſtock of manure, muſt be ſeverely felt; and, on farms not abounding with hay, his expence in buying it, or the diſadvantage attending the ſale of his cattle at improper ſeaſons, muſt be equally great. In a word, on farms where green crops are not regularly cultivated, no material improvement in the breeds of live ſtock, eſpecially ſheep, can take place, unleſs at an expence greatly exceeding the value of ſuch improvement.

It is true, that ſome of the crops before mentioned are, in conſequence of the ſuperior excellence of the climate, better adapted to England than to Scotland; but turnips, potatoes, and carrots, which can be ſtored up, and preſerved from the winter froſts, may, and indeed are, cultivated, on particular farms, as food for horſes, cattle, &c. with as much advantage in the one kingdom as in the other; and the Scotch cabbage, which is a hardy plant, is known to ſtand

ſtand out very ſevere winters, without ſuſtaining much injury.

For theſe reaſons, as well as others that might be mentioned, the writer begs leave to recommend, as a moſt eſſential improvement, the ſtill more general introduction of green crops into the ſyſtem of Britiſh huſbandry; as by that means, more than by any other, the value of live ſtock will be improved; additional quantities of valuable manure procured; the art of agriculture advanced; and the intelligent farmer reap profits, adequate to his ſuperior ſkill, attention, and exertion.

CHAP.

CHAPTER XVI.

Natural and Artificial Herbage, as that of Meadows, Clover, Rye-graſs, &c. and the moſt approved Methods of making Hay.

A GREAT majority of the Engliſh farmers ſtill reſt their chief dependence on meadow-hay, for ſupporting their live ſtock during winter and ſpring. Thoſe in Scotland, on the other hand, apply the term meadow, or haugh, to all level low-lying lands, in whatever manner occupied; and, conſider that, without the paſturge afforded by the artificial graſſes they cultivate, it would be impoſſible to carry on the ordinary operations of huſbandry.

In the following ſections, it is propoſed to give a ſhort account of the management of meadows

meadows in England, and of the moſt approved methods of cultivating artificial graſſes in both kingdoms.

Section I. Of Meadows, and the beſt Methods of making Meadow-Hay.

II. Of Red Clover, and Rye-Graſs.

III. Of Sainfoin.

IV. Of Natural and Artificial Paſtures.

SEC-

SECTION I.

Of Meadows, and the beſt Methods of making Meadow-Hay.

MEADOWS ſignify generally all graſs-lands that are commonly mown for hay; but more properly ſuch, as from their low damp ſituation, are unfit to bear the treading of cattle in wet ſeaſons. Meadows, properly ſo called, from having been ſubject to the overflowings of rivers, were conſidered unfit for the cultivation of grain; and were, on that account, ſet apart for the purpoſe chiefly of growing graſs to be made into hay. Where, at the original diviſion of landed property in England, no grounds of this deſcription happened to fall to a manor, or lordſhip, others in more elevated ſituations, were appropriated for that purpoſe, and were, by way of diſtinction, called Up-land Meadows.

The greateſt proportion of the meadow-lands in England, are chiefly compoſed of, or at leaſt greatly enriched by, an accumulation of the fine mould waſhed down from the higher grounds, and depoſited by the overflowing of the gently running rivers, with which that kingdom abounds. Theſe meadows are, therefore, when

when properly managed, very productive; and whether the crops are devoted to paſturage, which, ſince the introduction of artificial graſſes, is often the caſe, or reſerved for the purpoſe of being made into hay, they are commonly abundant; and in either caſe, the incloſed meadows may be ſaid to be in general both uſefully and profitably employed.

There is a great difference in the management, as well as in the productiveneſs, of thoſe meadows that are mown every year, or every other year; ſuch as are incloſed being much better managed than thoſe which remain in the open-field ſtate.

Incloſed Meadows.—When a meadow is incloſed, ſubdivided, and parcelled out among the tenants who occupy the adjoining farms, the manuring it occaſionally, is conſidered as an indiſpenſable part of the management. Care is alſo taken to ſpread the mole-hills, and the dung that drops from the cattle while paſturing on the after-graſs, after the hay is removed. One method of enriching meadow-lands is, to ſow ſoot, aſhes, or any other of the more valuable manures, over the ſurface in the ſpring. Theſe being waſhed into the ſoil by the next rains that fall, produce conſiderable effects on that year's crop, as well as on thoſe crops that ſucceed.

When farm-yard dung is applied, it is, for the moſt part, previouſly mixed with earth, together alſo with a portion of lime, chalk, or marl. The compoſt ſo formed, being turned over ſeveral times, all the various ſubſtances are intimately blended together, and the whole reduced to a mouldering, crumbling ſtate. This is an excellent method for renewing the fertility of meadow-land, as the manure not only ſpreads over the ſurface more equally, but muſt produce greater and more laſting effects, than can be expected, either from the application of farm-yard dung alone, or from lime, chalk, or marl, without a mixture of other ſubſtances.

Another method of fertilizing meadow-lands, is, by flooding or watering. This method is now generally adopted in ſeveral counties, and partially introduced into many more. When lands are allowed to remain for a great number of years in graſs, flooding them occaſionally, is found from experience, to be highly advantageous; while the expence on ſuch lands is very inconſiderable. The advantages to be derived from flooding meadow-lands, will be afterwards more particularly taken notice of, when deſcribing the manner in which that operation is performed.

It is common, after the crop of hay is removed from an incloſed meadow, to allow the horſes, cattle and ſheep, on the farm, to paſture

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on the after-graſs for the remainder of the ſeaſon; but when the weather becomes wet or rainy, the horſes and cattle are always removed, in order to prevent the ſward from being broken or injured. At the end of the graſs-ſeaſon, the gates of the incloſed meadows are ſhut, and no ſpecies of live ſtock is allowed to enter during winter, or ſpring, or rather not until the cloſe of the next year's hay-harveſt. When meadows are managed in the manner above deſcribed, it will not be conſidered extraordinary, that abundant crops of hay are commonly reaped; and that the graſs, during the remainder of the ſeaſon, ſhould be conſidered by the farmers as of great importance.

Open Field Meadows.—The management of theſe is very different indeed from that above-mentioned. Being property-land only for a few months in the year, the groſſeſt negligence, of courſe, is obſervable in the conduct of every poſſeſſor. Theſe open-field meadows are never manured; the whole horſes, cattle and ſheep in the pariſh, are allowed to range over them uncontrolled, from the cloſe of hay-harveſt till the end of March, or the beginning of April: And, while the mode of improving the quality and quantity of graſs, by means of irrigation, is entirely neglected; there are very few inſtances, where any degree of attention is beſtowed

to

to prevent the lands from being overflowed at improper ſeaſons.

When the crop is carried off, year after year, even from the moſt fertile lands, and no means adopted to recruit or enrich them, it is obvious they muſt ſoon be worn out and exhauſted to ſuch a degree, as to render the produce in time very inconſiderable. The abſurd, although generally eſtabliſhed cuſtom, of permitting the whole live ſtock in a pariſh to range over thoſe meadows at pleaſure, during the winter and ſpring months, when the ſward is moſt liable to be injured, requires no comment. It is equally unneceſſary, to take up much time in deſcribing the advantages that would accrue, were the proprietors or farmers to expend a little money, and ſome labour, for the purpoſe of preventing the overflowing of theſe lands at every flood. It is a common obſervation, that what is conſidered as the buſineſs of the community, is ſeldom attended to by individuals, even thoſe the moſt materially intereſted. This obſervation is particularly applicable in this caſe. Much damage is often done to the graſs when growing; and the farmers are frequently eaſed of a great ſhare of the trouble and expence of hay-harveſt, by having their whole crop ſwept away by a ſudden flood; yet they never think of uſing the proper methods to guard againſt ſuch loſſes in future, far leſs of turning the rivers, the ſources

of their misfortunes, into means of effecting a certain, eafy, and at the fame time ſubſtantial and laſting, improvement of theſe meadows. *viz.* by irrigation.

Such being the manner in which theſe meadows are managed, or rather miſmanaged, it would be ſurpriſing, if, in ordinary ſeaſons, any other than a ſcanty crop ſhould be obtained. On the whole, it may be ſafely aſſerted, that a very conſiderable proportion of the meadows in the open-field pariſhes in England, are the moſt unproductive lands, conſidering their quality, and ſuſceptibility of improvement, of any in the iſland; nor is there any well-founded reaſon to hope, that an alteration for the better, at leaſt of any importance, will be effected, ſo long as they are occupied as commons, or commonable lands for half the year, which is evidently the caſe.

Meadows in Scotland.—An Engliſh reader will no doubt be ſurpriſed at what is ſtated in the introduction to this chapter, *viz.* that there are ſcarcely any lands in Scotland treated as meadows; more eſpecially, conſidering how indiſpenſably neceſſary an allotment of meadow to every farm is ſuppoſed in the greateſt part of England.

In almoſt all the cultivated parts of Scotland, the introduction of artificial graſſes has entirely ſuperſeded

ſuperſeded the uſe of natural herbage, either for paſture or hay. It does not, indeed, appear, that there ever were, at leaſt not for this very long period, any lands in that kingdom, ſuſceptible of cultivation, that were allowed to remain conſtantly in graſs, except ſome low-lying lands in the vallies along the banks of the rivers and ſtreams, in the internal and moſt remote parts of the Highlands.

In theſe diſtricts, the climate is ſo late and cold, and withal ſo rainy, that the graſs which is allowed to arrive at ſuch maturity as to be proper for making into hay, is generally ſo much injured by long continued rains while harveſting, as to be fit only for the half-ſtarved animals which are ſupported on it during winter and ſpring.

There is but a ſmall portion of the lands in Scotland, that could with any degree of propriety be converted into meadow, however profitable that ſyſtem of management might be rendered. The rapidity with which the rivers run to the ocean, is ſo great, and their courſes are for the moſt part through ſuch mountainous and unproductive tracts, that in place of the adjoining low lands being benefited by an acceſſion of rich fertile mould, as is commonly the caſe in England, they are overſpread with ſand, gravel and ſtone, at almoſt every flood.

Meadow-

Meadow-Hay.—The proceſs of making meadow-hay, being different from that adopted in regard to artificial graſſes, a deſcription of both methods is therefore neceſſary.

When a crop of meadow-graſs is luxuriant, it often turns yellow at the bottom, even before it begins to flower. When that happens, it ſhould be immediately cut, as otherwiſe it will be in danger of rotting; or at any rate, a bad flavour will unavoidably be communicated to the hay. If the farmer be not impelled by this, or ſome other particular motive, to deviate from the ordinary rule, the proper time for mowing meadow-graſs, is when it begins to flower, and before the ſtalks acquire a hardneſs, which they always do, in proportion as the ſeeds advance towards maturity.

As meadow-graſs, when cut in full flower, is very ſoft and ſucculent, the making it into hay, without loſing the natural ſap, which is conſidered of great importance to have preſerved, is therefore, in all caſes, an arduous taſk; but becomes more or leſs ſo, in proportion as the climate is ſteady or variable. The method practiſed for many years in Middleſex, has been proved from experience to be as well calculated for preſerving the colour and natural juices of the hay, the great objects that merit attention, as any that has fallen under the writer's obſervation, or that is generally adopted in any other diſtrict. There the whole proceſs

of

of meadow hay-making, from the ſcythe to the ſtack, may be ſaid, in good weather, to be the work only of three or four days.

The graſs mown before breakfaſt on the firſt day is tedded, (teaſed), ſpread out, and turned over before the afternoon; and, when hands can be procured in plenty, and the weather proves favourable and inviting, it is turned and tedded a ſecond time, formed into what is called wind-rows, and afterwards put into ſmall cocks.—On the ſecond day, the haymakers are firſt employed in turning and ſpreading out the graſs cut after breakfaſt on the preceding day; they then ted and ſcatter the hay that was put up in cocks the former evening, into what are called ſtraddles. Theſe they again turn over ſoon afterwards; and that being done, they ſpread out the graſs which was mown in the morning in the manner above mentioned. In the afternoon, the ſtraddles, or ſcattered parcels of hay, are raked into what are called double wind-rows, for the convenience of their being put into larger cocks than thoſe of the preceding day; and the day's labour is finiſhed, by putting the graſs that was mown in the morning into cocks more ſuitable to its green moiſt ſtate.—It would be tedious to detail the proceedings of the third day, except in ſo far as the graſs of the firſt morning's cutting requires attention. The firſt operation of the third day is to ſpread it out

again

again into ſtraddles, and to turn it ſoon afterwards. If the weather have proved remarkably favourable, the hay is by this time, that is, on the afternoon of the third day, in proper condition to be carried; but if it have been cloudy, or if any rain have fallen ſince the mowing began, the prudent farmer puts it again into cocks; theſe are, however, increaſed conſiderably in ſize beyond thoſe of the former days. On the fourth day, it is carried and ſtocked; and if theſe various operations be not interrupted by bad weather, or retarded on account of a ſcarcity of hands, the buſineſs of hay-harveſt goes on in the ſame regular order from its commencement to its concluſion. This expeditious mode of making hay having been found, in Middleſex, not only practicable, but in ordinary ſeaſons always ſucceſsful, is one convincing evidence of the advantages which thoſe enjoy who cultivate lands favourably ſituated in regard to climate. Well adapted as the above-mentioned method of making hay may be to the climate of the ſouthern diſtricts of England, yet it would be extremely hazardous for farmers, in others more ſubject to rain, or where the hay-harveſt commences at a later period, to expoſe their hay ſo much in the courſe of making, to be damaged by ſudden and unexpected falls of rain. An attempt at this expeditious mode of hay-making is very probably the chief cauſe why ſo many

accidents happen by ſtacks of hay taking fire in England, as well as that large quantities are often ſo much heated as to be rendered unſaleable at market, and ſcarcely of any value to the owner.

In the northern and weſtern diſtricts of that kingdom, more cautious methods of making hay are adopted. In place of keeping it expoſed, and conſtantly working among it during almoſt the whole period, from the time the graſs is mown till the hay is put into the ſtack, it is commonly put, ſoon after being mown, into ſmall cocks of three or four forkfuls each. Theſe cocks are repeatedly turned, but very ſeldom ſpread out, unleſs there appear a certainty that no rain will fall till after the hay can be ſecured from receiving any material damage by being again put into cocks. This method, although much ſlower than the former, is, in a variable climate, more ſecure; as in rainy weather, there is leſs riſk of the hay ſuſtaining damage; while, on the other hand, when the weather is hot and ſultry, the hay is completely made without much of its juices being extracted, and at an expence comparatively ſmall.

Many other methods of making meadow-graſs into hay might be deſcribed, as in almoſt every county where that branch of huſbandry is eſtabliſhed, there are ſhades of difference in the management, and which cannot fail to be always the caſe where ſo much depends on climate, by the

the influence of which, principally, the operations of hay-harveſt are either accelerated or retarded.

The two methods above mentioned are ſuited, the one for a very favourable, the other for a precarious climate; and every farmer, as he finds himſelf ſituated in theſe reſpects, muſt be the beſt judge which of them he ought to adopt, and to what degree it is prudent to expoſe mown graſs to the influence of the weather in the courſe of making it into hay. General rules in regard to the mode of carrying on ſome branches of huſbandry will apply to almoſt every caſe: There are others, where, however accurately general rules may be laid down, the ſucceſs depends on ſuch a variety of circumſtances, that experience alone can direct even the moſt intelligent farmer how far theſe ſuit his particular ſituation.

SEC.

SECTION II.

Of Red Clover and Rye-graſs.

THERE are three kinds of clover well known, and now generally cultivated in theſe kingdoms, *viz.* the red, the white, and the yellow, or hop clover. The two laſt are only ſown when it is propoſed the field ſhould remain for ſome years in graſs, and will therefore fall more properly under conſideration when treating of artificial paſtures.

Red Clover—is for the moſt part cultivated along with a ſmall quantity of rye-graſs. The crop is either cut, and uſed as green food for horſes and black cattle, or made into hay. Red clover-ſeed is alſo frequently ſown along with a variety of other graſs-ſeeds, when the intention is to cut the crop the firſt year for hay, and to paſture the field for ſome years afterwards.

This plant thrives beſt in clay, or in ſtrong deep loamy ſoils. The quantity of ſeed allowed to the Engliſh acre, when it is intended to plough up the field after the firſt or ſecond year, is from ten to fifteen pounds, to which is commonly added about a buſhel of rye-graſs ſeed.

It

It was formerly conſidered improper to ſow graſs-ſeeds of any kind along with oats, barley, or other white-corn crops. This opinion, however, has been clearly and ſatisfactorily proved to have been ill-founded, and muſt have been at firſt promulgated by thoſe who were better acquainted with the theory than with the practice of agriculture. Every practical farmer now knows, that if a crop of graſs be the principal object in view, there is a greater chance of its proving abundant when the ſeeds are ſown with barley particularly, than when ſown alone. This fact is ſo completely eſtabliſhed, that there are, it is preſumed, few inſtances where the method above mentioned is ſtill adopted. The general practice is, to ſow not only red clover, but all other graſs-ſeeds, with oats or barley, in the ſpring. When the ſeeds are ſown, which is uſually done as ſoon as the grain is harrowed-in, the field is again gently harrowed, and afterwards rolled, ſo as to cover the ſeeds, and ſmooth the ſurface of the field, that the ſcythe may paſs eaſily over it the following ſeaſon.

Red clover, when the ſeed is ſown along with, or rather immediately after barley, and at the rate of twelve or fifteen pounds to the acre, frequently overtakes, or overtops, the crop of barley ſo much, as materially to injure it. Were the clover-ſeeds not ſown till the barley had vegetated

getated to the height of three or four inches, this loſs and inconvenience would, in all probability be avoided; at the ſame time the crop of barley would rather be improved than injured by a light harrowing at that ſtage of its growth, while the clover-ſeeds would vegetate as freely, and the crop of graſs prove as abundant, as if the ſeeds had been ſown at an earlier period.

It is an eſtabliſhed rule in many diſtricts for an entering tenant to pay the one who removes a certain ſum, from 10 s. to 20 s. the acre, for liberty to ſow graſs-ſeeds along with the outgoing tenant's barley. This rule, it is fair to preſume, has been eſtabliſhed on proper principles, and that the payment ſo made, is no more than an equitable compenſation for the injury which the removing tenant ſuſtains by granting this permiſſion. If ſo, the average loſs, ſay 15 s. the acre, which is incurred by ſowing red clover along with barley-ſeed, muſt appear of conſiderable magnitude to thoſe who ſow a fourth, a fifth, or a ſixth part of their farms every year with barley and red clover-ſeeds. The method above ſuggeſted for obviating this loſs and inconvenience, cannot poſſibly be attended with any bad conſequences to either of the crops in queſtion, and as it would in all probability prevent this evil, which is ſo generally complained of, it certainly merits the conſideration of thoſe who, having repeatedly ſuſtained heavy loſſes

from

from the failure of their crops of barley, are of courſe more immediately intereſted.

The general introduction of clover, and other cultivated graſſes, is one of the greateſt improvements in modern huſbandry. The commencement of improvements in the different ſpecies of live ſtock, in the modes of cultivation, and in the ſuperior quality, as well as quantity, of the crops of grain, may all be dated from the period when the ſowing of graſs-ſeeds was firſt introduced into the different diſtricts.

One acre of red or broad clover, will go as far in feeding horſes or black cattle, as three or four of natural graſs. It muſt at the ſame time be acknowledged to be a dangerous food for black cattle that have not been accuſtomed to feed on that kind of graſs, and on that account they ſhould never be turned into a clover field in wet weather, eſpecially in the morning, and before they have eat any other ſort of food. Care ſhould alſo be taken to keep them conſtantly moving about while feeding. If theſe precautions be not attended to, cattle are very apt to hove and burſt, after feeding on a field of red clover, as they eat it with great avidity, and ſwallow the mouthfuls before they are ſufficiently chewed.

Many recipes have been held out as proper to be adminiſtered to cattle when hoved or ſwelled with clover, all of which are ſaid to be efficacious,

efficacious, if properly and ſeaſonably applied. Some have recommended ſalt and water; others new milk; and others again to ſtab the animal in the flank, near the hip-bone, to avoid wounding the entrails, and to put a quill or reed into the orifice, ſo as to afford a free paſſage to the wind. This laſt the writer has ſeen frequently practiſed, and for the moſt part with ſucceſs, but when the operation is performed by an unſkilful practitioner, which muſt often be the caſe, the riſk muſt be great, and the chance of effecting a cure precarious and uncertain. Another, and a very ſimple method, the writer has alſo ſeen adopted for curing cattle ſwelled with clover, and with ſuch ſucceſs, in ſeemingly deſperate caſes, that he conſiders himſelf well warranted to ſtate it to the public, as one on which the greateſt reliance may be placed. It is as follows: When cattle that are fed on red clover begin to hove or ſwell, break an egg, and fill the leaſt half of the ſhell with common tar, which, being forced down the animal's throat, gives immediate relief ſo ſoon as it reaches the ſtomach. This ſimple application will be found ſeldom to fail in operating a complete and ſpeedy cure, if uſed in proper time; that is, before the animal falls down.

Large quantities of red clover ſeed are imported into this country from the Continent; but a great proportion of what is neceſſary for ſupplying

plying the annual demand is ſaved from the crops cultivated in England. When it is propoſed to ſave the ſeeds of red clover, the firſt crop of graſs ſhould be cut early, ſo that the ſecond, whence the ſeeds are procured, may be ready for cutting by the end of Auguſt or beginning of September. The reaſon of making choice of the ſecond crop is, that it always branches out into more ſeed-bearing plants or ſtalks, than the firſt crop, and conſequently a greater quantity of ſeeds is procured from the ſame extent of land. Beſides, the hay of a firſt crop of clover is more valuable than that of the ſecond; and as it is neceſſary to thraſh clover-hay very much in order to ſeparate the huſks in which the ſeeds are incloſed from the ſtems or ſtalks, the loſs of hay is, of courſe, leſs conſiderable in the one caſe than it would be in the other, while the crop of ſeed is at the ſame time more abundant.

A crop of clover, of which it is propoſed to ſave the ſeeds, ſhould be allowed to ſtand till the huſks become quite brown, and the ſeeds have acquired a degree of firmneſs. It ſhould then be cut, and harveſted in every reſpect like other hay; and the ſeeds thraſhed out at any period during the following winter or ſpring, according to the farmer's convenience. The quantity commonly reaped, is from four to five buſhels the Engliſh acre; weighing, when thoroughly clean, from two to three hundred weight.

The expence of thraſhing is conſiderable; not leſs than from 5 s. 6 d. to 7 s the buſhel. This great expence, which, from the laborious nature of the work, cannot be reduced, while the operation continues to be performed by manual labour, may, it is hoped, ſoon induce ſome intelligent mechanic to conſtruct a machine, by which the labour would be greatly leſſened, while the work would be as completely, and more expeditiouſly, performed.

In Bradley's Huſbandry and Gardening *, there is an account of a machine uſed for the purpoſe in Flanders, where the cultivation of clover was introduced much earlier than in Great Britain, which he deſcribes in the following words: "In Flanders," ſays he, "I "have ſeen two or three ways of doing it (thraſh- "ing out clover-ſeeds) by engines, after the "heads of the ſeeds are thraſhed off by com- "mon flails. The engine, which I beſt remem- "ber, has a hopper at the upper end of a trough, "ſo that the heads of the ſeeds fall conſtantly "from the hopper into the trough. The ſaid "trough is about ſix feet long, and about two "feet and a half over, and lies ſlopewiſe from "the hopper, which is at the higher end, ſo as "to drop at the other end about a foot. The "bottom of this trough, within ſide, is made "rough by chiſſels; and upon it, is a board, "made to draw backwards and forwards, which

"is

* Vol. ii. part 2. page 39, &c.

" is cut in a rough manner like the inſide of the " bottom of the trough. When the ſeeds fall " into the trough at the upper end, the broad " board in its motion draws them through the " trough, and thereby breaks or opens the ſeed- " veſſels, ſo that the chaff and the ſeed run out " of the lower end, ready for winnowing. This " motion is maintained by a water-wheel, and a " crank, and anſwers very well the purpoſe it is " deſigned for. I have ſeen an engine of this " kind, where the bottom of the trough was a " hurdle, more finely wrought than our com- " mon hurdles; and the ſliding part which I " call the broadboard, was an hurdle of the ſame " make. In this, I found, that moſt of the " pure ſeed fell through the lower hurdle, and " little more than chaff was diſcharged by the " lower end of the trough, and conſequently " muſt give leſs trouble in the winnowing or " cleaning from the chaff. I have alſo ſeen an- " other kind of mill or engine for this purpoſe, " which ſomewhat reſembles the mills which " tanners uſe to grind their bark. In the for- " mer, I ſhould have mentioned, that there is " commonly a weight laid upon the upper hur- " dle or board, the better to break the heads of " ſeeds that paſs between that and the bottom " of the trough."

From the ſimplicity of the machine above deſcribed, it is ſurpriſing, that ſome ſuch has not

not been long ſince erected for the purpoſe in England, where ſo great quantities of clover-ſeeds are annually ſaved. Were thraſhing-mills generally erected in that kingdom, it is highly probable they might in time be made not only to thraſh off the heads of the clover from the ſtalks, but, by means of ſome ſuch machinery, as above deſcribed, be made alſo to ſeparate the ſeeds from the huſks.

Rye-graſs—is well known to be both a hardy and an early graſs; both theſe qualities it poſſeſſes in an eminent degree, beyond every other cultivated in theſe kingdoms. Rye-graſs is now very generally introduced in Scotland, and alſo in many of the Engliſh counties. This ſpecies of graſs is cultivated on all ſorts of ſoils; even moſs or peat-earth, newly reclaimed, produces luxuriant crops. It is, as has been already obſerved, frequently ſown with red clover, when it is propoſed to convert the crop into hay; and on all the fields intended to be devoted to paſturage for ſome years, rye-graſs ſeed, to a certain extent, is always ſown. In the former caſe, from two pecks to a buſhel, and in the latter, from a buſhel and a half to two buſhels, is the ordinary allowance to the acre.

Large quantities of rye-graſs ſeed are annually ſaved both in England and Scotland. The methods are various, but none of them expenſive,

five. In ſome places, particularly when the crop is cloſe and luxuriant, it is reaped with the ſickle, and harveſted like wheat. In others, it is mown in the common way; and being gently turned over in the ſwath once a-day, for ſome days, till it is thoroughly dried, it is then thraſhed on cloths in the field, in the ſame manner as cole-ſeed; but the more general practice is, to make the crop into hay, and to thraſh out the ſeeds during winter, or in the following ſpring, as beſt ſuits the market, or the farmer's convenience. The quantity of ſeed reaped from the acre, is, in ordinary ſeaſons, from thirty to forty buſhels, and the price from 2 s. to 3 s. 6 d. the buſhel. Were the practice of reaping rye-graſs with the ſickle generally adopted by thoſe who intend to ſave the ſeed, and who poſſeſs thraſhing-mills, the expence of thraſhing would be in a great meaſure ſaved; and although the expence of reaping might be ſomewhat greater than that of mowing, yet, if what muſt be neceſſarily incurred in making the crop into hay in the latter caſe, is added, and which in the former is ſaved, the difference, if any, would be inconſiderable.

The farmers in Scotland have of late years ſuſtained much loſs and inconvenience from a ſort of annual rye-graſs ſeed having been imported at different times from England. This is an impoſition of a very ſerious nature, as many Scotch farmers

farmers can teſtify, who, after having laid out their fields to graſs in high condition, and at conſiderable expence and trouble, with a view of allowing them to remain in graſs for ſeveral years, have been obliged, in conſequence of the total failure of the rye-graſs the ſecond year, to break them up, after, in a great meaſure, loſing the ſecond year's crop.

Many doubts have been entertained, whether there were more than one ſpecies of this plant; but it is now evident, there are two: And Mr Marſhall, in his Rural Oeconomy of Glouceſterſhire, particularly mentions the circumſtance: "Men of obſervation," he obſerves, "aſſert, that there are two ſpecies of "rye-graſs, now in cultivation, in this diſtrict: "The one, annual; the other, perennial. The "former, the ordinary ſort, which is ſold at the "ſhops; the latter, raiſed in theſe hills. This "is a ſtrong evidence of the advantage to be "expected from the cultivation of the native "rye-graſs of a county *."

Here the writer cannot help making an obſervation, which, although ſome may conſider as rather ill-timed, all muſt agree is well-founded; namely, that the Legiſlature of theſe kingdoms, has hardly ever of late turned its attention to framing laws or regulations regarding agriculture,

* Vol. ii. page 73.

ture, except when the intereſts of commerce and manufactures were to be thereby promoted. One caſe very much in point, occurs to his recollection. It is well known, that the venders of lintſeed in this country, if they diſpoſe of it under the name of Dutch lintſeed, are obliged, if required by the purchaſer, to produce certificates, that the ſeed ſo ſold, is not only the growth of Holland, but alſo, that it is the crop of a particular year; and ſhould any fraud be diſcovered on the part of the vender, he is ſeverely puniſhable, by laws and ſtatutes enacted for that expreſs purpoſe. Conſidering the immenſe quantities of ſeed-grain, as well as graſs ſeeds, that are ſent from London annually to every diſtrict of theſe kingdoms, and the great loſſes which farmers reſiding at a diſtance frequently ſuſtain by getting ſeeds, either of different qualities mixed up together, or of a general bad quality, or of a former year's growth, it would certainly be found policy in the Legiſlature to eſtabliſh ſome regulation, whereby evils ſo great, and ſo generally complained of, might in future be avoided. It is undoubtedly the peculiar province of the national Board of Agriculture, to pay attention to the legiſlation of the country, ſo far as huſbandry is concerned; and it would be highly proper and praiſeworthy in the members of that Board, not only to ſupport, but to exert every endeavour to eſtabliſh the meaſure

meaſure here ſuggeſted, *viz.* ſome regulation, whereby a farmer who reſides in a remote part of the country, may have a certainty of procuring ſeed of a good quality, free of mixture, and of the ſort which he knows would ſuit his particular ſoil and ſituation. If the regulations, in regard to the ſale of lintſeed, have proved ſufficient for the purpoſe of preventing the cultivators of flax from being defrauded, why not extend them to the ſeeds of grain and of graſs? That theſe ſhould be procured, when commiſſioned, wholeſome, and unadulterated, is unqueſtionably of more importance to the farmers, and to the nation at large, than any improvement that can take place, either in regard to lintſeed or flax.

Clover and Rye-Graſs Hay.—The making a crop of clover and rye-graſs into hay, is an operation more or leſs tedious and expenſive, according to the proportion of either of theſe graſſes of which it is compoſed. If the greateſt proportion be clover, it requires from its ſucculency, conſiderable time and labour to render it fit for ſtacking. If, again, rye-graſs preponderate in the mixture, as it a leſs juicy plant, a ſhorter period and leſs trouble is neceſſary. The common practice in thoſe parts of Scotland, where this ſort of hay is made in the greateſt quantities, is to allow the graſs to remain in the ſwath, as it falls

falls from the ſcythe, for a day or two, till the upper ſide is pretty well dried; it is then turned over; and after remaining in that ſtate for a like period, it is tedded, or ſpread out, and afterwards put into ſmall cocks, of thirty or forty ſtone each, where it remains for ſix or eight days, or longer, according to the weather. It is then put into larger cocks, called tramp-cocks, each containing two or three loads, in which ſtate it is allowed to remain till it be ready for being ſtacked, which is ſeldom done for a week or two afterwards. When the hay is put into tramp-cocks, the danger is over, as even long continued falls of rain ſeldom do any material injury, beyond that of ſpoiling a little of the hay on the top of the cocks. This method, although very oppoſite to that adopted in Middleſex, in regard to meadow-hay, is nevertheleſs found, in practice, to anſwer every purpoſe that can be deſired. The tubular ſtems, or ſtalks, of theſe cultivated graſſes, being larger and leſs ſoft and ſpungy than thoſe of natural graſs, they do not ſink down ſo much when put into cocks; and for that reaſon, air, ſo eſſential for keeping hay ſweet and well-flavoured when making, is not excluded to ſuch a degree, as to injure it either in ſweetneſs or flavour.

SECTION III.

Of Sainfoin.

THIS herb or plant, which was firſt introduced into England from France, about the end of Charles II.'s reign, derives its name from its ſuperior nutritive quality; *ſainfoin* ſignifying holy, or wholeſome hay.

To give the Scotch reader an idea of the appearance which ſainfoin exhibits when growing, for it has never been cultivated in that kingdom; it may be obſerved, that a field of ſainfoin, when in flower, has, at a little diſtance, very much the appearance of red clover.

There is no ſort of graſs cultivated in this iſland, that merits the attention of farmers more than this, and particularly of thoſe who poſſeſs ſuch light, ſandy, gravelly, or chalky ſoils, as will ſcarcely repay the expence, when cultivated for crops of grain. It is ſaid, that on lands of ſo poor quality, as not to be worth more than a rent of a ſhilling or two the acre, a ton, or a ton and a half, of ſainfoin-hay is frequently reaped, while ſoils of a rich, dry, friable nature, produce ſtill more abundant crops. The properties of this ſort of graſs are, that it will grow on the pooreſt ſoils;

ſoils; and that on thoſe of tolerable quality, the crops will continue good for fifteen or twenty years together. It is known to be excellent food for all ſorts of cattle, either green, or after being made into hay. Sainfoin is alſo earlier than clover, and continues much longer in vigour. Cattle are not ſwelled when feeding on it, as is often the caſe, when they paſture on red clover; and on the authority of Mr Tull, it may be further ſtated, that ſainfoin enriches land, even although the crop be mown every year. Sainfoin is ſometimes ſown with oats; but the more common and generally approved method is, to ſow it with barley after turnips. It was formerly conſidered indiſpenſably neceſſary by thoſe who cultivated ſainfoin, that the lands ſhould be made as clean as poſſible before ſowing the ſeed; and in order to effect this the more completely, they were always ſummer-fallowed. It has, however, been aſcertained by many repeated trials, that ſainfoin, like other graſſes, will thrive when the land is only in an ordinary ſtate of preparation, and even when it is to a conſiderable degree over-run with couch-graſs, and other weeds. From what is above ſtated, it is hoped no inference will be drawn, in favour of ſowing ſainfoin-ſeed on lands worn out and full of weeds, rather than on ſuch as are in good tilth. Weeds cannot poſſibly tend to improve the crops, either of grain or graſs. The

circumſtance

circumſtance of ſainfoin thriving on exhauſted lands, is only mentioned, with a view of informing the reader, that this ſpecies of graſs may be cultivated to advantage, on lands in the ordinary ſtate of management, and without that tedious and expenſive preparation that was formerly deemed neceſſary, and which probably deterred many farmers from introducing it into their ſyſtem of huſbandry.

The quantity of ſeed allowed to the acre, is from one and a half to two buſhels; the price, from three to ſix ſhillings the buſhel. Thoſe who have cultivated ſainfoin to the greateſt extent, recommend very ſtrongly the cutting, in place of paſturing, the firſt year's crop, as the roots of the young plants are in great hazard of being injured when the firſt year's crop is paſtured. The roots of ſainfoin are very large, and penetrate amazingly deep into the earth, if not prevented by a *ſub-ſtratum* of rock, or of cold wet clay; which laſt very quickly deſtroys them. They alſo ſend forth a great many lateral branches, which, extending in various directions, tend in a few years to thicken the ſward. The roots being of ſo large a ſize, it is not only dangerous, as has been ſaid, to paſture the firſt year's crop, but alſo to permit live ſtock, particularly ſheep, to paſture a ſainfoin ley, too bare at any period, as they are apt to injure, and frefrequently to deſtroy, the roots, by eating into

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the bulb. The ordinary mode of managing ſainfoin-grounds, is to mow them every year, and to eat off the after-graſs with a light ſtock of lambs, ſheep, and cattle. Sainfoin, like red clover, is frequently cut before it begins to flower, and uſed as green food for horſes and cattle; when that is done on ſoils of tolerable quality, a ſecond crop fit for cutting is uſually procured in the courſe of the ſeaſon.

Sainfoin-hay.—When it is propoſed to make a crop of ſainfoin into hay, it is cut when in flower, and afterwards managed in every reſpect like red clover. When the ſeeds are to be ſaved, the crop is allowed to ſtand till they become plump and firm, and the huſks of a browniſh colour. It is then mown, and after being allowed to remain in the ſwath till the upper ſide is well dried, it is then turned over. This muſt be done with great care, and as gently as poſſible, the ſeeds, very unlike thoſe of clover, being apt to fall out, if the greateſt attention is not beſtowed. When the other ſide of the ſwath is alſo dry, the crop is either thraſhed on the field, or carried home, and built up in the ſtack-yard. The thraſhing of ſainfoin, for the reaſon above mentioned, is not near ſo expenſive as that of clover, and by thoſe who have erected thraſhing mills, might be reduced to a mere trifle, as thoſe machines could not fail to operate very completely in thraſhing a crop, the ſeeds ſo which ſeparate ſo eaſily from the ſtraw.

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SECTION IV.

Of Natural and Artificial Paſtures.

THE natural paſtures of theſe kingdoms fall to be claſſed under various heads, as waſtes, commons, meadows, and what may be termed old graſs-lands. The two former will be particularly taken notice of in a future chapter. The management of meadows has already been treated of, and therefore the only natural paſtures that fall properly under review in this ſection, are the

Old Graſs-Lands.—The extent of lands of this deſcription in England, is very conſiderable, eſpecially in thoſe parts of the country where incloſing became general at an early period. Perhaps in ſome few diſtricts the extent of lands formerly in tillage, but now in a ſtate of permanent paſturage, may exceed that at preſent under cultivation. In Leiceſterſhire in particular, this is in all probability the caſe. To ſay that all the old graſs-lands in England were unproductive, would be going by much too far. A conſiderable ſhare of them is managed with the ſtricteſt attention; and when it is conſidered, that

that the expence of management is trifling, and that the tithes are much leſs than what are payable from a corn-farm of equal extent, they may be juſtly conſidered, both by landlord and tenant at leaſt, as under a profitable ſyſtem of occupation. But in ſo far as the nation is intereſted, the caſe is the reverſe. Although ſome of theſe lands are managed in the beſt manner, of which, as graſs-lands, they are capable, yet they are not ſo managed as to render them to the greateſt degree productive, which the writer heſitates not to ſay, can only be done by rendering them what in England are called convertible lands, that is, ſubjecting them to alternate courſes of grain and graſs huſbandry. If the beſt managed old paſture-lands be comparatively unproductive, the loſs which ariſes to the public at large, as well as to individuals, from the negligent and ſlovenly manner in which a great ſhare of theſe lands are managed, muſt be immenſe. In how many inſtances does a ſhameful inattention, in regard both to under and ſurface drainage, appear even to the paſſing ſtranger? How many thouſands of acres are over-run with buſhes and ant-hills, to ſuch a degree, that a ſcanty crop, and that of herbage of the worſt quality, is only produced? What abundant crops of docks and thiſtles are to be ſeen in many incloſures, while in others, weeds, ſtill more noxious, grow luxuriantly? How ſuperior in

quantity and quality is the herbage produced on lands recently laid down to graſs in proper condition, beyond what theſe permanent paſtures yield? And, laſtly, what a trifling produce do theſe grounds yield, fit for the uſe of man, taking a period of twenty years together, in compariſon of what thoſe of the ſame extent and quality, cultivated under an alternate courſe of of grain and graſs huſbandry, afford? Certainly not a half, probably not a third.

Some Britiſh Senators, viewing the means by which the agriculture of this iſland might be improved through falſe mediums, have ſtrongly urged the propriety, nay, even neceſſity, of limiting the ſize of farms, while others, equally wide of the mark, have propoſed, that large premiums ſhould be given by the State, to thoſe who improved waſte lands, by planting potatoes, &c. Wefe effectual meaſures adopted for bringing theſe fields again into tillage, which the preſſure of the times compelled our forefathers to allow to lie in the neglected ſtate in which they ſtill remain, this iſland might in a ſhort period be again rendered the land of plenty. But this is anticipating a ſubject which will fall more properly to be diſcuſſed in a ſubſequent chapter.

It is ſcarcely neceſſary to obſerve that the ancient meadows and paſtures in England, in place of being ſown out with graſs-ſeeds, were, like the

the out-field lands in Scotland, committed to nature's charge. She in time bountifully ſtocked them with ſuch graſſes and weeds as were natural to the ſoil, or as were carried thither by the winds from the adjoining fields. In too many inſtances this practice, improper as it evidently is, has undergone little improvement in modern times. It is true, when it is now propoſed to lay out a field with a view of its remaining a great number of years in graſs, it is much better cultivated and prepared, and art, as well as nature, is employed to ſtock it with plants. Botanical writers on huſbandry are at great pains to deſcribe all the various ſorts of graſſes found in natural paſtures: But if we examine the practice of thoſe who are the greateſt advocates for permanent paſtures, we will find, that the ſeeds commonly ſown are a mixture of rubbiſh ſcraped together from a ſcore of different hay-lofts, and ſold by the London ſeedſmen under the denomination of hay-ſeeds, or they are collected by the farmers themſelves from their former year's ſtock of hay. In reſpect to the inſufficiency of theſe ſeeds, and the little dependence which the farmers place on them, it may be ſtated, that from eight to ten, ſometimes twelve, buſhels are ſown on the Engliſh acre,—a quantity much greater than would be neceſſary were it expected that even one third would vegetate. When it is conſidered to what an extent all the meadow

hay in England is heated in the ſtack, it is obvious the vegetative powers of theſe ſmall ſeeds muſt be greatly injured, if not entirely deſtroyed. Beſides, as the meadows and old paſtures contain a great variety of graſſes, and as the hay, not the ſeeds, is the object of the farmer's attention, a few of them only, and theſe probably of the very worſt ſorts, may have arrived at maturity when the crop was mown: Further, it may be obſerved, that different ſoils produce naturally different plants, and of courſe, if the ſeeds of graſſes which grow naturally on a dry light ſandy ſoil, be ſown on ſtrong loams, there is little chance of the land being fully ſtocked with uſeful plants, at leaſt for ſome years. All theſe circumſtances conſidered, it is certainly matter of ſurpriſe, that the Engliſh farmers do not more generally ſubſtitute rye-graſs, white and yellow clover, *&c.* in place of this compoſition of they know not what.

Artificial Paſtures.—Beſides the artificial, or what may be denominated the cultivated graſſes, already mentioned, as red-clover, when a ſmall quantity of rye-graſs only is added, and ſainfoin, both of which crops are for the moſt part made into hay, ſome others as being more peculiarly adapted for paſturage, require to be particularized. When a field is laid down to graſs for for three, four or five years, the farmer has generally

nerally two objects in view, namely, to make the firſt year's crop into hay, and to paſture the field afterwards, ſo long as it remains unbroken up. In order to increaſe the quantity of hay, a few pounds of red-clover are generally ſown with the other ſeeds, which would not happen, if it were intended to paſture the firſt year's crop. Rye-graſs is always ſown, whether hay or paſture be the object; and although ſome writers deſcribe it as a very bad graſs, yet the practical farmer appears ſatisfied, that the contrary is the caſe, or at leaſt that there are no others of that tribe of graſſes which he can cultivate to ſo much advantage, either for hay or paſture, eſpecially if the the paſture be kept fully ſtocked in the early part of the ſeaſon. The other ſeeds commonly cultivated for paſture, are white and yellow clover, and rib-graſs.

White Clover,—commonly called Dutch clover, from the circumſtance of large quantities being annually imported into theſe kingdoms from Flanders by way of Holland, grows naturally in almoſt all the paſtures of Great Britain. White clover, beſides being the ſweeteſt and beſt food for every ſpecies of live ſtock, poſſeſſes the ſuperior quality of being a permanent plant. As white clover does not grow to a great height, but rather ſpreads on the ſurface, it therefore forms a cloſer ſward than any other of

the cultivated graſſes, and on that account, is always ſown on fields intended for paſture. The allowance of ſeed is regulated by the kinds and quantities of the others ſown at the ſame time, but may be reckoned from four to eight pounds the Engliſh acre. This ſpecies of graſs is cultivated on every ſort of ſoil, but thrives beſt on that which is of a dry and friable nature. There is but a ſmall quantity of white clover ſeed ſaved in England, and the inſtances are very rare where it is attempted in Scotland. In the mode of conducting the proceſs, there is little variation from that above deſcribed, for ſaving the ſeeds of red clover.

Yellow or Hop Clover,—ſometimes called trefoil, is a plant alſo natural to this country, and to be found in all paſtures where the ſoil is dry and light. It poſſeſſes the property of continuing long, and another of no leſs importance, that of thriving on ſoils of the lighteſt nature. Yellow clover commonly forms a part of the mixture of graſs-ſeeds ſown on lands intended for paſture, and three or four pounds to the acre is the ordinary allowance.

Rib-Graſs, or Ribwort-Plantain,—is a ſort of graſs now very much cultivated in Scotland, as well as in ſeveral diſtricts in England. It is an herbage of which cattle are extremely fond, and

and it is ſaid to be equally good, both for fattening cattle, and for milch cows. From four to ſix pounds are ſown on the acre. It is an indigmous plant of this country, and frequently abounds in old rich paſtures.

Theſe are the graſſes commonly cultivated under what may be called the modern ſyſtem of graſs-huſbandry. As that ſyſtem is now very generally introduced into almoſt every diſtrict, and completely eſtabliſhed in not a few, it is unneceſſary to waſte time in deſcribing the ſuperior advantages that are known to reſult from an adherence thereto, beyond what can be derived either from allowing a field to provide itſelf with graſſes, as was the ancient practice, or from ſowing a confuſed mixture of ſeeds, the qualities and properties of which, although much has been written on the ſubject, are yet but little known.

There are unqueſtionably many graſſes now growing as neglected weeds, which by proper care and attention, might in time be added to the liſt above mentioned, and with great advantage to the practical farmer; but till that be done, and their uſefulneſs proved by experience, he will do well to ſow the ſeeds of graſſes that have been regularly cultivated, and of the value of which he has had undoubted proofs. In other words, in place of following the example of that adventurous mariner, who, (without a compaſs

compaſs to direct his courſe), attempts to navigate a ſhip in an unknown ſea; he will act more judiciouſly, and certainly leſs hazardouſly, by taking a pilot on board, whoſe knowledge of of the coaſt will enable him to ſteer the veſſel free of all thoſe rocks and ſhoals to which it muſt otherwiſe be expoſed.

CHAP.

CHAPTER XVII.

The Methods of harveſting the Crops of Grain in each of the Two Kingdoms, and the beſt Means of preſerving them afterwards.

IT was endeavoured, in the two preceding chapters, to deſcribe the beſt manner of cultivating green crops, and of managing graſs lands to advantage. The means that ought to be uſed for preſerving the former during winter, and for making the latter into hay, were alſo pointed out. Harveſting the crops of grain in a proper and huſbandman-like manner, being a matter of the greateſt importance, not only to farmers, but to all ranks and deſcriptions in the country; an account of the various methods uſually practiſed, well merits a ſeparate chapter.

The difference in the periods at which the corn harveſt uſually commences in the various diſtricts

diſtricts of theſe kingdoms, is very conſiderable: Greater, probably, than what takes place in any other country of the ſame extent in Europe. Almoſt every diſtrict varies from another in this particular; inſomuch, that the ordinary duration of the Britiſh harveſt, cannot be reckoned at leſs than three months. It commonly begins, in the ſouthern and midland counties of England, about the latter end of July, or the beginning of Auguſt; and in the northern parts of Scotland, about the firſt or ſecond week of September. In theſe laſt-mentioned diſtricts, it is ſeldom finiſhed, even in favourable ſeaſons, till towards the end of October, and frequently not till the beginning or middle of November.

Scarcely more various are the periods at which harveſt commences in the different parts of the iſland, than are the modes in which the ſeveral operations incident to that buſy ſeaſon are performed. On inveſtigation, ſome peculiarities in the method of harveſting the crops, will be found attached to almoſt every diſtrict; many of which, if attempted to be introduced into others, would be conſidered as improper, and in ſome as abſurd. Whoever, for inſtance, would recommend to the farmers of Sutherland and Caithneſs, the methods of mowing and harveſting corns in ſwath, or in cocks, as is practiſed in ſeveral of the Engliſh counties, would infallibly

ſibly expoſe himſelf to the ridicule of the ſenſible and intelligent. Every farmer, entitled to the name, muſt know, that the method of harveſting a crop, which does not come to maturity till October or November, ought, from the uſually precarious ſtate of the weather at that ſeaſon, to be very different; and that more precaution is neceſſary to preſerve it from injury, than what is requiſite in July or Auguſt, when the day is ſo much longer, and the ſun poſſeſſes ſuperior influence. This obſervation, although it does not account for all the various modes in which the crops of grain are harveſted in theſe kingdoms, (many of which are continued rather in conſequence of long habit and early prejudices, than from a conviction of their expedience), is, notwithſtanding, a ſatisfactory reaſon, why more precaution is uſed in the northern parts of the iſland, than is conſidered neceſſary in the ſouth and eaſt diviſions. There the harveſts commence at an early period, and the huſbandman has of courſe but little to apprehend from long continued tracts of unfavourable weather, or the ſudden approach of winter.

In deſcribing the different methods of harveſting the crops, the following arrangement appears well calculated to give the reader a clear and comprehenſive view of the ſubject.

Section I. Methods of harvesting Wheat, and Rye.

II. Of Mowing, and harvesting in Swath and in Cocks.

III. Of Mowing, and binding into Sheaves.

IV. Of reaping Oats, Barley, Beans, &c.

V. Of Housing, Stacking, and Thatching.

VI. Of the Methods adopted for preserving Grain.

SEC-

SECTION I.

Methods of harveſting Wheat and Rye.

THE crops of wheat and rye are everywhere reaped with the ſickle, or reaping-hook; an inſtrument that ſeems to have been uſed, for the ſame purpoſe, in the earlieſt ages. It is taken notice of by Moſes in the following words: "Thou ſhalt not move a ſickle unto thy neighbour's ſtanding corn *."

In ſome of the midland counties of England, and in ſeveral of thoſe in the ſouth-eaſt coaſt, the crops of wheat are reaped at the height of twelve or fifteen, ſometimes eighteen, inches from the ground. The handfuls, as they are reaped, are laid on bands, made of ſome reeds of the crop, knotted together near the ears, in the ordinary way. Theſe parcels, being bound up into what are called ſheaves, are either allowed to lye on the ſtubble for a few days, previous to their being carried home to the barn, or they are ſet up on their bottoms, in double rows, the head of the one ſheaf inclining towards that of the one oppoſite, and forming, including

* Deut. chap. xxiii. v. 25.

cluding the baſe, an irregular triangle. When the crop is carted off, the ſtubble is mown with a ſcythe, and being raked into heaps, is carried to the farm-yard, and either uſed for thatching houſes, or corn or hay ſtacks, or as litter.

In the north and weſt of England, and in every part of Scotland, where wheat and rye are cultivated, the crops are reaped as near the ground as can be conveniently done. The ſheaves, after being bound, are ſet up in ſhocks, provincially ſtooks. Theſe conſiſt of a double row, of five or ſix ſheaves on each ſide; over which, in moſt diſtricts, two ſheaves are placed in ſuch a manner, as to cover the tops of thoſe in the ſtook. Theſe are called hood, or cap ſheaves; and, when placed judiciouſly, have a ſurpriſing effect in preventing, even very heavy rains, from wetting, or at leaſt materially injuring, the grain below. It ought to be remarked, that this practice of hooding or covering the tops of the ſtooks, muſt, in any climate, conſiderably retard the completion of the harveſt; as the crop, in that caſe, cannot be ſo ſoon ready for being houſed, or put into ſtacks, as when it is fully expoſed to the influence of the weather. The propriety of uſing this precaution, in order to guard againſt the conſequences of bad weather, muſt therefore depend, in a great degree, on the period at which the crop is reaped, the ſtate of the weather at the time, and the general

ral nature of the climate in the particular diſtrict. In all theſe, there is frequently ſo great, and it may almoſt be added, ſo uniform a difference, that the meaſures which an attentive farmer, in ſome ſituations, will find it prudent regularly to adopt, would be in others, if not improper, at leaſt leſs neceſſary. To what, but to the circumſtance of the harveſts commencing at earlier periods, and that the weather continues more uniformly favourable, is it owing, that the farmers in the ſouth of England never hood or cover their wheat in ſheaf, and that this precaution is never omitted in the northern diſtricts? If this variation in practice be not accounted for by the reaſons above aſſigned, the writer acknowledges himſelf ignorant of the origin whence it ſprung.

The practice of leaving the wheat-ſtubble ſo long, as to render mowing afterwards requiſite, is alſo confined to the ſouthern and midland counties. Although this be unqueſtionably a remain of the mode of harveſting introduced by the Romans, it does not appear worthy of imitation, being liable to many objections, which do not apply to the other and more generally eſtabliſhed method.

It is well known to every unprejudiced farmer, who is in the habit of ſuperintending reapers, that the higher the crop is cut, the more heads and ſtalks are dropped; and whoever takes the trouble to examine a field, where a long ſtubble has

has been left, will find the loſs of grain incomparably greater, than where the crop has been reaped pretty cloſe to the ground. Beſides, the reaping a crop of wheat, barley, or oats, of ordinary length and thickneſs, is not only better and cleaner, but alſo more expeditiouſly performed, when cut near the ground. The reaper, by gently leaning the handful he has reaped againſt the ſtanding corn, can go on to cut, and keep together, with the greateſt facility, a much larger quantity than he is able to graſp with his hand. Whereas, when the crop is cut twelve or eighteen inches from the ground, the reaper muſt graſp the ſtalks before cutting, or they will infallibly drop among the ſtubble, and be loſt. In the former caſe, an expert reaper will, at every time he ſtoops, reap three or four times the quantity that can be done by the perſon who lays hold of every ſtalk. If to this be added the loſs of grain, and of ſtraw, and the great additional expence of mowing, raking, carting, and ſtacking the ſtubble, it will probably be difficult for the moſt zealous advocates for this mode of harveſting, if it be ſuperior to the other, to point out wherein that ſuperiority conſiſts.

This practice, no doubt, originated from the idea, that appears to have been entertained in former times, that, in place of building the crops of wheat in ſtacks, as is now the ordinary method

method, in the other parts of theſe kingdoms, it was indiſpenſably neceſſary to houſe them.

The force of prejudice, and a diſlike to innovations of every ſort, may alſo have tended not only to the long continuance, but alſo to the ſo general eſtabliſhment of this practice. For theſe cauſes are well known to operate ſo powerfully on the human mind, that in all ages and countries, practices to which men have been long habituated, are ſlowly and unwillingly relinquiſhed, even in favour of thoſe which are evidently preferable.

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SECTION II.

Mowing and harveſting in Swath and in Cocks.

In many of the ſouthern counties of England, the crops of oats and barley, as well as thoſe of peaſe and beans, are mowed with the ſcythe, and either repeatedly turned over in the ſwath, or made up into cocks, where they remain till ready for being carried to the barn or ſtack-yard. When that is the caſe, the waggons are ſet to work, and all hands that can be ſpared are employed in raking the grounds. In a word, thoſe who are acquainted with the uſual manner in which the operations of hay-harveſt are carried on, muſt have a very correct idea of this method of harveſting crops of grain.

Mowing and harveſting grain in ſwath, or in cocks, if a practice that can in any climate or ſituation be conſidered beneficial, can only be deemed ſo where the harveſts commence at an early period, and where the climate is remarkably mild, favourable, and ſteady: That being the caſe, there is no probability that it will ever be generally eſtabliſhed in theſe kingdoms.

The advantages reſulting from harveſting crops of barley, oats, &c. in ſheaf, compared to the practice adopted in the diſtricts above alluded to, are in the writer's apprehenſion both

great and numerous. They are conciſely enumerated by a reſpectable writer on huſbandry, who, although accuſtomed to the method of harveſting in ſwath, ſeems equally ſenſible of the ſuperiority of the other. He ſays: "The comparative advantages of harveſting barley and oats in ſheaf are numerous. The waſte throughout is leſs; the corn, eſpecially in gaits*, is at once got out of the way of the weather; the labour of carrying, houſing, or ſtacking, is much leſſened; much barn-room is ſaved; the labour of thraſhing is leſs; the ſtraw, if the harveſt prove wet, makes much better fodder; and, under this circumſtance, the corn preſerves its colour in ſheaf incomparably better than it does in ſwath †." He goes on to ſtate the *apparent inconveniency* of harveſting corn in ſheaf, which he makes to conſiſt in "the increaſe of colour at the outſet;" and concludes in the following words: "Upon the whole, it is evident, that the quantity of mens labour is diminiſhed, not increaſed, by the practice of harveſting in ſheaf. If to this be added the eaſe and expedition in the buſineſs of carrying, (the moſt important buſineſs of harveſt, and that which requires the quickeſt diſpatch), we may fairly conclude, that by

* This term will be fully explained in the 4th Section.

† See Marſhal's Rural Oeconomy of Yorkſhire, vol. i. p. 396.

"harveſting in ſheaf, the labour, the anxiety, "and the hazard of harveſt are leſſened, while "the quality, and conſequently the value, of the "produce is increaſed."

Had Mr Marſhal, when he wrote his Rural Oeconomy of Yorkſhire, been as well acquainted with the great benefits derived from uſing thraſhing-mills, as many Scotch farmers now are, and had he alſo known the almoſt impoſſibility of thraſhing clean by theſe machines, unleſs when the corn is ſpread evenly on the board, and taken in regularly by the feeders, he would have ſtated this as one great reaſon why the crops of oats and barley ſhould be harveſted in ſheaf. In the writer's opinion, that circumſtance is of itſelf ſufficient to induce ſenſible and intelligent farmers in any part of England to change the mode of harveſting, ſo as to enable them to participate in the advantages that the Scotch farmers receive from the uſe of a thraſhing-mill, which, in point of utility, is not inferior to any machine of modern invention.

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SECTION III.

Of Mowing, and binding into Sheaves.

In ſeveral parts of England, particularly in Yorkſhire, and ſome adjoining diſtricts, it is uſual to mow crops of oats, barley, beans, &c. with the ſcythe, and afterwards to bind them into ſheaves, and ſet them in ſtooks, in the manner deſcribed when treating of one of the modes commonly practiſed in harveſting wheat. When it is intended to harveſt corn in ſwath or in cocks, the ordinary method is, to mow outward, that is, from the ſtanding corn, in the way in which graſs is mown; but when it is propoſed to bind up the crop into ſheaves, it is mown to the ſtanding corn. By this means, and by placing what is called a cradle over the ſcythe, or by fixing twigs of willow formed into a bow on the lower end of the ſcythe-ſhaft, the corn is made to fall eaſily and regularly off the ſcythe, and to reſt againſt the ſtanding corn in a leaning poſture. A woman and a boy generally follow every mower. The boy is, for the moſt part, employed in making bands, but, occaſionally, alſo, in binding ſheaves. The woman, with a long-toothed wooden rake, with a ſhort ſhaft or handle, gathers the mown corn into parcels about the

the ſize of a ſheaf, and, with no leſs dexterity than quickneſs, lays it regularly into the band, without ever ſtooping or touching it with her hands. When the mower has got to the end of the field, he begins to bind and ſet the ſheaves into ſhooks, which he continues to do, during the whole of his progreſs towards the end of the ſwath, where he began mowing. The woman is, in the mean time, employed in raking the ſtubble, which, on land that had been properly harrowed and rolled, is eaſily done, and ſo effectually, that ſcarcely a ſtalk is loſt *.

This method of harveſting oats, barley, &c. may, for many reaſons, be deemed ſuperior to that of reaping, and on that account merits the more than ordinary conſideration of thoſe who are hitherto ſtrangers to the practice, and who are not ſo much wedded to ancient cuſtoms as to diſregard every mean of improvement, becauſe not generally adopted in the diſtricts where they reſide. The ſcarcity of labourers, and the rapid advance in the rates of harveſt-wages, are ſeverely felt, and loudly complained of. Every method, therefore, whereby the number can with propriety be reduced, and by which alſo various deſcriptions of labourers, as men and women, boys and

* The method of harveſting above deſcribed, the writer had occaſion to ſee adopted near Malton, in the North Riding of Yorkſhire. But ſeveral variations from any particular mode are often diſcernible in common practice.

and girls, can be introduced with advantage into the harveſt-field, muſt tend to obviate the loſs, inconvenience, and additional expence, to which farmers are ſubjected, in conſequence of the ſcarcity of hands which at theſe ſeaſons is but too often experienced.

Without the aid derived during the harveſt months from the poor neglected peaſantry of the mountains of Wales and the Highlands of Scotland, the crops in many of the more fertile parts of theſe kingdoms could not, by the preſent generally eſtabliſhed method of harveſting, be got cut down and ingathered, without abſtracting a great number of uſeful hands from the various manufactures of the country, and at ſuch rates of wages as would almoſt amount to a prohibition againſt the cultivation of grain.

The proprietors of the remote parts of Wales and Scotland will, it is hoped, be induced from motives of intereſt, if not from motives of patriotiſm, to ſet about the improvement of their eſtates, and the introduction of ſome of the uſeful arts, ſo as to furniſh employment for their people. Should events ſo deſirable take place, the harveſting the crops in the other parts of Great Britain will be attended with difficulties, of which the generality of farmers have at preſent no conception, and which can only be effectually avoided by gradually introducing ſuch methods of performing the various operations, as if

if eſtabliſhed, would render the aſſiſtance of ſtrangers unneceſſary.

The writer has, devoid of local prejudices, examined, with the greateſt attention, the method of harveſting adopted in Yorkſhire, and is perfectly ſatisfied in his own mind, that it is, in every point of view, preferable, as a general mode, to any other adopted in the iſland. It ought, therefore, in his opinion, to be introduced into the north and weſt of England, and into every part of Scotland, more eſpecially wherever improved cultivation and numerous and extenſive manufactures have been eſtabliſhed.

The rates of harveſt-wages are ſo various in the different parts of theſe kingdoms, that it would be difficult, or rather impoſſible, to aſcertain the medium; but this is of little importance. It may be more uſeful to remark, that a man, accuſtomed to uſe the ſcythe, will go over as much ground in a day as four reapers are able to do. The expence, by uſing the ſcythe in place of the ſickle, would therefore be leſſened; the number of hands reduced; and ſeverals, of deſcriptions different from thoſe at preſent employed, might be rendered ſerviceable; and, of courſe, leſs difficulty would occur in procuring the requiſite number. The work, at the ſame time, would be at leaſt as completely, and certainly more expeditiouſly performed; while a greater quantity of ſtraw, an article always neceſſary, and often valuable, would be annually procured.

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SECTION IV.

Of reaping Oats, Barley, Beans, &c.

ALTHOUGH theſe crops are ſometimes mown with the ſcythe, yet in the greateſt part of the iſland they are reaped with the ſickle. In ſome parts of England, the crops are for the moſt part reaped by women; but in Scotland, the number of men and women employed is nearly equal. In general, the ploughmen are no further engaged in the harveſt-work than in bringing home the crop to the ſtack-yard; in ſome particular diſtricts, however, eſpecially in thoſe north of the Grampian mountains, every operation of ploughing, harrowing, &c. is ſuſpended, and the ploughmen bear a ſhare in the labours of the field.

There is nothing in regard to the method of reaping corn that appears worthy of particular remark. The crop is generally cut within a few inches of the ground. Two, and ſometimes three reapers put their handfuls, when reaped, into the ſame band, which is made by one of the reapers. One man commonly binds and ſtooks after five reapers; but when theſe are expert at uſing the ſickle, it is hard labour for the binder. Hooding or capping the ſtooks is in ſome counties ſeldom attended to; in others, again,

again, it is never omitted, even in the moſt favourable ſeaſons.

In late rainy harveſts, the preſervation of the crop becomes ſometimes a difficult, always an arduous taſk. Beſides the ordinary methods of ſtooking and hooding, others are often adopted, as *gaiting and butting*, but this is only done when from the precarious ſtate of the weather, the crop, without extraordinary exertions, would be in danger of being materially injured. Gaiting corn, a practice very common in the counties of York, Durham, Northumberland, Aberdeen, Banff, &c. is a method well calculated for harveſting corn, in late bad ſeaſons, with ſafety and expedition. It is thus performed: The ſheaf, in place of being bound tight, and near the middle, which is the uſual method, is tied ſlackly, and the band moved up till it reach ſome of the ears. The binder then ſets the ſheaf with ſome force on its bottom, ſo as to give it a baſe to ſtand upon. When corn is gaited by a perſon experienced in the buſineſs, he always thruſts his hand down through the middle of the ſheaf, after it is ſet on end, and ſpreads out the bottom, leaving the middle hollow, and taking care always to form a ſmall opening towards the ſouth, by which means both the air and the rays of the ſun have the greateſt poſſible influence in preſerving the crop, and rendering it fit for being ſtacked. When corns are cut wet, which

is

is frequently the caſe towards the cloſe of a late harveſt, this is probably the beſt mean that can poſſibly be deviſed for averting the impending evil. The method of endeavouring to ſave corn in bad harveſts, by hutting it in the field, is often practiſed in the north and weſt of Scotland, and with very great ſucceſs, eſpecially when put up in a tolerable ſtate of dryneſs. The huts are formed on the field, as ſoon as the corns are reaped and bound up into ſheaves. They are only made of ſuch a ſize, that a man can build them ſtanding on the ground; and uſually contain from twelve to twenty ſtooks, according to the bulk of the ſtraw. When theſe huts are properly formed, and a ſheaf or two ſpread carefully over the top, ſo as to anſwer the purpoſe of an umbrella, ſcarcely any weather, however bad, or of however long continuance, will materially affect the grain. The writer had occaſion to ſee one of theſe huts taken down, which had ſtood for a conſiderable period, (five or ſix weeks), under the moſt ſevere rains that happened during any harveſt ſince the year 1782, and except a few of the top-ſheaves, the whole was in a ſtate of preſervation truly ſurpriſing. This was the more remarkable, as the crops in ſome adjacent fields where that precaution had not been adopted, although carefully ſtooked and hooded, were grown and matted together in ſuch a manner, that every ſtook formed a connected maſs not only of vegetable but of vegetating ſubſtances.

The loſs, inconvenience, irritation, and anxiety, to which farmers are ſubjected during a tedious unfavourable harveſt, are real evils; and can at beſt be but alleviated, even by the greateſt attention and exertion.

When the harveſts are late, the weather unfavourable, and the approach of winter apprehended, the hutting of corn in the field, may be ſafely recommended as a beneficial practice. When the weather continues long rainy, and there is a riſk of the grain ſpringing in the ear, or that a heavy fall of ſnow will take place, (for this the writer has repeatedly ſeen happen before the cloſe of harveſt), the beſt method is, to reap and gait with all expedition.

Every perſon, even thoſe who are novices in the art of huſbandry, on reading the above account of ſome of the methods of harveſting practiſed in the northern diſtricts, will naturally exclaim,—How moderate ought to be the rent! how indulgent the landlord! where the huſbandman is obliged to have recourſe to ſuch expedients, to ſave from deſtruction the fruits of the labours of the year!

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SECTION V.

Of Houſing, Stacking, and Thatching.

In ſeveral of the midland, but more particularly in the ſouth-eaſt, counties of England, where it was obſerved, in a former part of this work, that the barns were in general of an uncommon large ſize, it is uſual to houſe all, or at leaſt as much as poſſible, of the wheat crop, immediately from the field. In the other parts of Great Britain, wheat, like other crops, is built into ſtacks, in a yard allotted for the purpoſe, adjoining to the barns, into which it is put only when the farmers find it convenient or neceſſary to have it thraſhed.

The crops of oats, barley, beans, and peaſe, are everywhere built in the ſtack-yard. Sometimes, eſpecially when they are harveſted in ſwath, or in cocks, the ſtacks are built in an oblong form, and when finiſhed, reſemble a houſe with the roof on; but when the crops are bound up in ſheaves, the ſtacks are commonly built round, exhibiting the form of a bee-hive.

In regard to houſing the crops from the fields, it can be done with propriety only, when they are thoroughly dry; and is therefore a method which,

which, were it adopted to any extent, in ſeveral diſtricts where the climate isparticularly precarious, could not fail to be attended with bad conſequences. Building the crops in ſtacks, is without doubt the beſt mode for preſerving both the corn and the ſtraw, but it ſhould be remarked that, in order to avoid loſs by vermin, and to prevent the bottoms of the ſtacks from ſpoiling, or becoming muſty, by being placed on damp ground, they ought always to be built on pillars, either of ſtone or of wood. When that is done, and the caps of the pillars are of ſuch dimenſions, and ſo placed, as to prevent rats or mice from aſcending, corn, well-built and properly thraſhed, will keep in good condition for a very conſiderable period.

Although there is a great difference in the ſize and ſhape of the waggons, carts, *&c.* uſed in carrying the corn from the fields, as well as in the ſtrength of the cattle by which they are drawn, yet, in the general mode of conducting the buſineſs, there is little variation.

The corns, in whatever manner harveſted, are put on the carriages, by perſons ſtationed on the fields for the purpoſe; and, being drawn to the yard, are forked on the ſtack by the carter. When the crops have been harveſted in ſwath, ſeveral perſons are employed in ſtacking, that operation being conducted in the ſame manner as when hay is ſtacked; but when the crop is bound

bound up in ſheaves, one man only is employed in forming the ſtack, unleſs it be of more than ordinary dimenſions; in which caſe, the aſſiſtance of a boy is commonly neceſſary, who, receiving the ſheaves from the carter, hands them to the perſon that builds.

In building corn-ſtacks, there is a ſymmetry attended to in the ſouthern part of the iſland, which is but little obſerved in the northern diviſion. The ſtacks formed of corns harveſted in ſwath, are neatly and evenly cut or pared, with a hay-knife, along the ſides and ends. This is done in ſo complete a manner, that it is impoſſible the ſtacks ſhould ſuſtain any injury from the weather, particularly if properly thatched; an operation which, in that part of the country where this mode of harveſting is practiſed, is for the moſt part performed with the greateſt attention.

The ſtacks built in the round form, in the ſouthern diſtricts, are alſo conſtructed in the beſt poſſible manner. In place of being wide at the bottom, and becoming narrower as they advance in height, (a method of building corn-ſtacks too common in ſome parts of theſe kingdoms), they gradually ſwell out; ſo that when the builder begins to form the head, or what may not unaptly be called the roof, the ſtack is conſiderably greater in circumference than at the bottom. Stacks ſo formed, if they do not afterwards

afterwards lean more to one ſide than another, which ſeldom happens, unleſs when the corns begin to heat, are certainly beſt for preſerving both the grain and the ſtraw.

Where the harveſts are uſually late and precarious, it is common to erect frames of wood, called wind-kilns, in the form of ſugar-loaves, and to build the corns around them. A conſiderable opening is always left at the bottom, oppoſite to that point whence the prevailing winds blow, and as another opening is alſo made at the top, the centre of the ſtack by this means becomes a kind of funnel; the benefit of which, in drying and preſerving corns in a precarious ſtate of harveſting, is ſo great, that it is ſurpriſing the cuſtom has not become general, wherever wood can be eaſily procured, and where ſuch precautions are neceſſary.

The practices of the farmers in theſe kingdoms, in regard to the modes of thatching corn, are like thoſe in various other matters connected with huſbandry, very different. In thoſe diſtricts, where the wheat ſtubble is mown after the crop is reaped, it is the univerſal practice, to uſe part of it in thatching the ſtacks. It is put on with great care and exactneſs, and in conſiderable quantities. One end being fixed into the roof of the ſtack, and the other, together with any looſe and irregular ſtraws, being pared or ſhaved off with a ſharp inſtrument, it forms a very

very neat ſubſtantial thatch, exactly reſembling in appearance the roof of a newly ſtraw-thatched houſe.

In the other parts of Great Britain, the longeſt wheat, rye, or barley ſtraw, is commonly uſed for the purpoſe of thatching the ſtacks. Being drawn into regular lengths, and the ſhort ſtraws and weeds ſeparated from it, the thatcher, beginning at the bottom of the roof lays or ſpreads it by handfuls, endways from top to bottom; and puſhing in and fixing the upper ends in the bottom of a ſheaf, thus proceeds, always partly overſpreading the preceding handful with the one that ſucceeds. When the roof is in this manner entirely covered with ſtraw, which is generally done to the depth of about four inches, the thatcher, who by this time has got to the top, receives a parcel of ropes made of twiſted ſtraw, which he lays perpendicularly over the the ſtack, and which are tied at the ſides by women or boys, to tufts of the corn, at regular diſtances. This operation being completed, the thatcher, ſtanding on a ladder, warps other ropes horizontally acroſs, which gives the roof the appearance of being covered with a coarſe kind of netting. This has been long proved a very ſafe and ſubſtantial method of thatching corn; and being leſs tedious and troubleſome than the other, is of courſe preferable.

In ſome of the northern parts of Scotland, where more precaution in preſerving grain is neceſſary,

neceſſary, leſs is commonly uſed. The ſtacks are huddled up without order or method, and thatched with broom, fern, ruſhes, &c. But there, among the tenantry, with few exceptions only, all is ignorance and ſloth.

From the detailed account of the various modes of harveſting the crops, contained in the preceding pages, it is hoped that farmers, even thoſe the moſt favourably ſituated in regard to climate, may learn ſomething uſeful. The writer has often remarked, that when the harveſts proved late and rainy in diſtricts which were in common bleſſed with favourable weather, there, the loſs was incomparably greater, than where the farmers, from being more frequently ſubjected to theſe ſevere viſitations, were more active, and better acquainted with the proper means to be uſed, in order to make the beſt of their particular ſituation.

It is deſirable to know the remedies proper to be applied for the cure of evils, which, although they do not often happen, yet do ſometimes take place. The farmers in the ſouthern parts of the iſland, may therefore find it for their advantage, to acquire a knowledge of the beſt modes of harveſting the crops, both of corn and hay, adopted in the more mountainous and leſs favourably ſituated diſtricts; as circumſtances may occur, that would render their following the ſame methods extremely beneficial.

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SECTION VI.

Of the Means of preſerving Grain.

THE beſt means of preſerving grain, from the time it is reaped till the farmers find it convenient to thraſh it, has already been ſtated, in ſo far as they have fallen under the writer's obſervation.

The methods moſt commonly uſed for preſerving this ineſtimable article, from the time it is thraſhed till it get into the hands of the manufacturer, by whom it is converted into meal, or malt, may be beſt aſcertained by a review of thoſe adopted for that purpoſe by the farmers, the proprietors, and the merchants.

It was formerly obſerved, how indifferently the great body of farmers in theſe kingdoms are ſituated as to farm-houſes in general. In reſpect to granaries in particular, the number is comparatively ſmall, even in the corn-diſtricts, who can be ſaid to poſſeſs the means by which they can ſtore up grain, without running great riſk of its receiving ſo much damage as to render it unmarketable? The beſt-conſtructed farm-granaries have been already deſcribed; and where ſuch are erected, and the grain laid thin

on the floors, it is kept in as perfect a ſtate of preſervation, as in any other granary in Europe. A great proportion of the thraſhed grain in the poſſeſſion of the farmers, is, however, kept in the chaff on the barn floors, or, after being cleaned and put into ſacks, is placed in that ſtate, either in the barn, or in ſome houſe appropriated for the purpoſe, till it be ſent to market. Neither of theſe laſt methods of keeping grain can be approved of, as in low damp floors it muſt ſoon become muſty, notwithſtanding any precautions that can be uſed to prevent it.

The tenantry in Caithneſs, and ſome of the neighbouring diſtricts, the writer has been informed, uſe a very uncommon mode of preſerving their grain. They twiſt ſtraw into large ropes, which they coil up in the ſame manner as ſailors do ſhips cables; and within theſe coils, the grain, when thraſhed and freed from the chaff, is depoſited.

From this account of the ſlovenly manner in which a great portion of the Britiſh grain is kept while in the farmer's poſſeſſion, it will be granted, that an improvement in this important particular, is eſſentially neceſſary. But as theſe improper practices originated in the want of liberality in the landlords, who did not grant the requiſite accommodation; and as they are continued only where theſe conveniences, without which

which grain cannot be properly preſerved, are ſtill withheld; it is to them, not to the farmers, that the nation ought to look for a general reform in this reſpect.

The proprietors in Scotland, who ſtipulate with their tenants, that a certain proportion of the rent ſhall be paid in grain, or in oat-meal, uſually erect ſtore-houſes on their eſtates, or at the moſt convenient ſea-port. Theſe being properly conſtructed, and ſubſtantially built, are well ſuited for the intended purpoſe. The meal is packed into neat, dry, cloſe chambers; and when ſtored in good condition, keeps perfectly ſound for two or three years. The grain is uſually put into the granary between Chriſtmas and Candlemas. It is laid on the floors to the depth of twenty-four or thirty inches, and is carefully turned over every eight or ten days; the windows are occaſionally opened to permit a free circulation of air, and proper attention is beſtowed to exclude vermin. It is therefore impoſſible, that grain ſo managed, if it has ſuſtained no damage in harveſting, and has been ſtored dry and in good condition, ſhould be rendered leſs fit for any purpoſe to which it can be applied, eſpecially, conſidering the ſhort period it remains in the granary, which ſeldom exceeds five or ſix months.

The granaries built, or rented by the corn-merchants, are for the moſt part conſtructed on proper

proper principles; many of thoſe in particular, that have been erected within theſe few years, are probably equal, if not ſuperior, to what are to be ſeen in any other country, where grain depoſited in the end of this year, is uſually ſold and removed before the cloſe of next year's harveſt. The management of the grain after it is laid in theſe granaries, is ſimilar to that above mentioned. Sometimes, owing to the want of ſufficient room, it is laid too thick, and begins to heat, which materially injures the quality. At other times, by mixing damp, ill-harveſted grain with that which is ſound, a muſty bad flavour is communicated to the whole; but inſtances of miſmanagement occur, and are diſcernible, in the modes of conducting every branch of buſineſs.

END OF VOLUME SECOND.